MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for June, 1901, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 159; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Hawaiian Government Survey, 200; Canadian Meteorological Service, 32; Jamaica Weather Office, 160; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rica Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Commander Chapman C. Todd, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San Jose, Costa Rica; Captain François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores, and W. M. Shaw, Esq., Secretary, Meteorological Office, London; Rev. Josef Algué, S. J., Director, Phillipine Weather Service.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard of time is that of San Jose, $0^h\ 36^m\ 13^s$ slower than seventy-fifth meridian time, corresponding to $5^h\ 36^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now always reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

No general storms which required special forecasts or warnings occurred within the region of observation during June, 1901. Forecasts of the direction and force of the wind and the state of the weather along the transatlantic steamship routes from the American coast to the Banks of Newfoundland were issued daily at 8 a. m. and 8 p. m. These forecasts covered the first three days out of steamers bound east from United States ports, and the morning forecasts were published, together with forecasts of fog, in the weather maps issued at Boston, New York, Philadelphia, Baltimore, and Washington.

Frosts occurred in the Northwestern States, and from the northern Rocky Mountain districts over the North Pacific coast States in the early part of the month. Warnings were issued well in advance of the frost which occurred in the northwestern districts.

Drought which prevailed early in the month in the spring wheat States of the Northwest was broken by rains, the occurrence of which was covered by timely forecasts.

Heavy rains and destructive freshets occurred in the mountain districts of Virginia about the 17th, and on the 21st freshets caused loss of life and property in West Virginia.

Snow flurries were reported at Lagrande, Oreg., and in northern Vermont on the 4th. From the 11th to the 13th a depth of 4 inches or more of snow was reported in the hills about Antelope, Oreg, and on the 14th snow fell at Laramie, Wyo.

CHICAGO FORECAST DISTRICT.

One of the principal features was the breaking of the drought in the spring wheat States in the northwest early in the month. The rain came at a most opportune time, as, otherwise, great damage would have been done. The forecasts for rain in that section were timely and influenced the price of wheat on the board of trade. Warnings were sent out on the 6th and 7th in advance of the frosts which occurred in the Northwestern States. The only storm that caused general high winds in the upper Lake region occurred on the 28th and 29th, and warnings were issued in ample time to advise all vessel interests.—*H. J. Cox, Professor.*

SAN FRANCISCO FORECAST DISTRICT.

No severe storms occurred, and there were no northers in the great valleys to injure crops. On the morning of the 4th

light frosts occurred in the northern part of the State, and the same condition occurred about a week later. Toward the close of the month high temperatures were reported in the great valleys of California, but, with the exception of the morning of the 30th, the winds were not particularly high.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

The month in the North Pacific States was unseasonably cool, and frosts frequently occurred in eastern Oregon and southern Idaho which did great damage to fruit and gardens. Most of the frosts were forecast, but some occurred without warnings, due to its being impossible to accurately foretell the irregular movements taken by abnormal high pressure areas.

The annual flood crest in the Columbia River passed Portland on the 3d, with a steerage of 20.8 feet. The river remained nearly on a stand for five days, and then slowly fell, passing below the danger line of 15 feet on the 20th. Forecasts of the daily stages for three days in advance for both Portland and The Dalles were made from the 1st until the 15th, when the announcement was made that the river would continue to fall at the rate of about three-tenths (0.3) of a foot a day during the next three days.—*E. A. Beals, Forecast Official.*

HAVANA, CUBA, FORECAST DISTRICT.

No general storm occurred in the West Indies during the month. During the second and third weeks excessive rains occurred over the greater part of Cuba, flooding lowlands, causing rivers to overflow, inundating contiguous lands, washing away crops, houses, stock, etc., and causing the loss of a few lives.—*W. B. Stockman, Forecast Official.*

RIVERS AND FLOODS.

The Missouri River, as is usual during the month of June, rose somewhat, but not to any unusual heights, no danger-line stages having been reported. The Missouri rise also caused a rise in the Mississippi River from Alton, Ill., to the mouth of the Ohio River. Above Alton, and below Cairo, Ill., the average stages were considerably lower than during May, 1901.

Over the Ohio watershed the rains were sufficiently timely and abundant to provide excellent navigable stages of water, averaging over 20 feet below the mouth of the Great Kanawha River. There was a moderate flood in the Great Kanawha on the 24th, the stage at Charleston, W. Va., reaching 30.9 feet, 0.9 foot above the danger line. This flood contributed an additional 10 feet to the Ohio below Point Pleasant, W. Va.

The James River and the rivers of South Carolina were high at times, and in several of the latter the danger lines were exceeded by several feet. Timely and accurate warnings of these floods were given. In the James River the danger lines were not quite reached, but in the vicinity of Richmond, Va., some inconvenience was caused in the lower portions of the city. The losses, however, were trifling, as the warnings were well heeded.

The highest and lowest water, mean stage, and monthly range at 137 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport on the Red.—*H. C. Frankenfield, Forecast Official*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	5, a. m.	53	109	11, p. m.	32	65	3,150	6.5	485	20.2
II	10, a. m.	54	114	13, p. m.	42	70	2,550	3.5	728	30.3
III	12, a. m.	54	114	15, p. m.	48	68	2,000	3.5	571	23.8
IV	16, a. m.	37	105	19, p. m.	40	75	2,000	3.0	667	27.8
Sums							9,700	16.5	2,451	102.1
Mean of 4 paths							2,425		608	25.5
Mean of 16.5 days									588	24.5
Low areas.										
I	1, p. m.	42	90	4, p. m.	46	60	1,780	3.0	593	24.7
II	1, p. m.	51	104	2, p. m.	38	97	800	1.0	800	33.3
III	3, a. m.	51	120	10, a. m.	49	64	3,500	7.0	500	20.8
IV	11, a. m.	37	105	13, a. m.	48	89	1,500	2.0	750	31.2
V	12, a. m.	23	82	14, a. m.	32	86	900	2.0	450	18.8
VI	13, a. m.	44	104	18, a. m	43	79	2,650	5.0	530	22.1
VII	16, a. m.	33	84	18, p. m.	35	76	525	2.5	210	8.8
VIII	22, a. m.	44	88	24, a. m.	44	71	925	2.0	462	19.2
IX	24, a. m.	51	114	25, p. m.	50	97	820	1.5	547	22.8
X	27, p. m.	38	105	30, a. m.	48	68	2,100	2.5	840	35.0
XI	29, p. m.	41	109	*1, p. m.	47	84	1,350	2.0	675	28.1
Sums							16,850	30.5	6,357	264.8
Mean of 11 tracks							1,532		578	24.1
Mean of 30.5 days									552	23.0

*July.

Geo. E. Hunt, Chief Clerk Forecast Division.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following summaries relating to the general weather and crop conditions are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau:

[Temperature is expressed in degrees Fahrenheit and precipitation in inches and hundredths.]

Alabama.—The mean temperature was 78.5°, or 0.3° above normal; the highest was 103°, at Livingston on the 27th, and the lowest, 48°, at Riverton on the 1st. The average precipitation was 2.80, or 1.90 below normal; the greatest monthly amount, 5.88, occurred at Camp Hill, and the least, 0.46, at Marion.

Wind and hailstorms in central and northern counties during first half of month caused considerable local damage to crops; otherwise, conditions moderately favorable for farm work and crop growth.—*F. P. Chaffee.*

Arizona.—The mean temperature was 77.3°, or 3.8° below normal; the highest was 123°, at Mohawk Summit on the 28th, and the lowest, 30°, at Flagstaff on the 11th, 14th, and 15th. The average precipitation was 0.01, or 0.24 below normal; the greatest monthly amount, 0.34, occurred at Supai, while none fell at a great number of stations.

Generally favorable conditions for the development of crops obtained during the first part of the month, and the harvesting of wheat was in active progress in the lower agricultural valleys during the second de-

cade. The wheat is of good quality and of average yield. The second crop of alfalfa had been cut by the middle of the month. A greatly diminished water supply for irrigation, during the latter period of the month, interfered with farming operations and materially arrested the growth of latter crops of hay.—*W. G. Burns.*

Arkansas.—The mean temperature was 79.4°, or 2.8° above normal; the highest was 110°, at Jonesboro on the 29th, and the lowest, 41°, at Pond on the 1st and 2d and at Witt Springs on the 1st. The average precipitation was 1.44, or 2.62 below normal; the greatest monthly amount, 4.13, occurred at Forrest City, and the least, 0.25, at Marvell.

The weather was generally hot and dry, except during the first ten days of the month when the rainfall was fairly well distributed throughout the State. Corn, though generally small for the time of year, was doing fairly well and was laid by in generally good condition; it had begun to tassel out by the end of the month; in some sections it had been affected by the dry, hot weather and had commenced to twist. Cotton had been well worked out, and, though small and the stands uneven, was growing nicely and was bunching well; in some localities squares were forming and some blooms had been reported. Wheat and oat harvest was about completed by the end of the month, and thrashing was progressing. The yield of wheat was fair to good, and in some sections it was turning out better than was expected, both as to yield and quality. Oats were short and in some localities almost an entire failure. Irish potatoes were generally fair to good, but were being injured by the drought and bugs. Fruit generally was in good condition, but in some sections continued to rot and drop before maturity.—*E. B. Richards.*

California.—The mean temperature was 70.5°, or 0.6° below normal; the highest was 124°, at Salton and Volcano on the 28th, and the lowest, 16°, at Bodie on the 24th. The average precipitation was 0.01, or 0.26 below normal; the greatest monthly amount, 0.43, occurred at Sierra Madre, while none fell at more than two-thirds of the stations.

The temperature was below normal during the greater part of the month, and heavy frosts occurred in some places, slightly damaging corn, potatoes, and other summer crops; fruit was not injured. Very high temperatures prevailed toward the close, the maximum reaching over 100° at many places, and 124° at two stations. The hot weather was accompanied by light northers in some sections, but crops were not materially damaged.—*G. H. Willson.*

Colorado.—The mean temperature was 63.2°, or about normal; the highest was 108°, at Delta on the 29th, and the lowest, 20°, at Wagon Wheel Gap on the 12th. The average precipitation was 1.45, or about normal; the greatest monthly amount, 4.58, occurred at Holyoke, and the least, 0.12, at Buena Vista.

Conditions generally favorable to agricultural interests. Winter and spring grains made favorable advancement, but the development of many upland field crops was retarded by lack of moisture. Small fruits were plentiful and the outlook for tree fruits continues satisfactory. Ranges afforded excellent pasturage, but many were failing rapidly at the close of the month.—*F. H. Brandenburg.*

Cuba.—The mean temperature was 81°; the highest was 101°, at Batabano on the 5th, and the lowest, 57°, at Matanzas on the 8th. The average precipitation was 8.22; the greatest monthly amount, 17.52, occurred at Manzanillo, and the least, 1.19, at Los Canos.

During the weeks ending June 15 and 22 the rains were excessive generally over the island and much damage was done by the submerging of lowlands, overflowing of rivers inundating contiguous lands and washing away many dwellings and tobacco houses, drowning of stock, washing out of crops on hillsides and glens, etc. At the close of the month there was an improvement in the conditions as the flooded rivers were subsiding, but much water was still standing in places in northwestern Matanzas. In northwestern Santa Clara much recently planted cane, in places amounting to more than one-half, was destroyed by the excessive rains, as were all small crops. Crops were also destroyed in southwestern Puerto Principe, and on the lowlands generally throughout the island crops were more or less damaged. At the close of the month tobacco selecting was progressing in Pinar del Rio and northwestern Puerto Principe, and soils where the plantings had been washed out or destroyed were being replanted. Worms are seriously damaging the canes and corn, and even the pastures, in southwestern Santiago, and the corn crop is jeopardized.—*W. B. Stockman.*

Florida.—The mean temperature was 79.4°, or 0.5° below normal; the highest was 103°, at Wausau on the 27th, and the lowest, 50°, at Quincy on the 2d. The average precipitation was 9.77, or 2.62 above normal; the greatest monthly amount, 21.72, occurred at Miami, and the least, 0.27, at Pensacola.

At the close of the month dry weather prevailed over the western portion of the State; elsewhere well distributed rains had fallen. Prospects favored a good corn crop over a large portion of the State. Cotton was small, fruiting slowly and very backward; in eastern and central sections it was grassy. Vegetables and fruits advanced very well, and large shipments were made. Setting sweet potatoes was delayed in western counties, owing to dry weather. Cane made a good growth.—*A. J. Mitchell.*

Georgia.—The mean temperature was 77.6°, or about normal; the highest was 103°, at Vidalia on the 25th, and the lowest, 47°, at Diamond on the 4th. The average precipitation was 5.26, or 0.71 above normal; the greatest monthly amount, 10.03, occurred at Millen, and the least, 0.99, at Oakdale.

The month was nearly normal with respect to temperature and precipitation, but the general conditions of the weather were detrimental to crops, and the situation at the close of the month was unsatisfactory. Lack of cultivation greatly damaged crops, and many fields of cotton were abandoned and allowed to run to grass. Peaches continued to rot and shed badly, lessening the output.—*J. B. Marbury.*

Idaho.—The mean temperature was 56.3°, or 4.0° below normal; the highest was 101°, at Garnet on the 18th, and the lowest, 17°, at Forney and Soldier on the 5th. The average precipitation was 1.10, or 0.20 above normal; the greatest monthly amount, 5.34, occurred at Murray, and the least, trace, at Boise, Garnet, and Idaho City.

On the morning of June 5 a frost of great severity and destructiveness occurred. It was most severe in the southwest and central counties, reducing the prospects for more than average crops of fruit to an outlook for very light yields. The damage to alfalfa and wheat was also considerable.—*S. M. Blandford.*

Illinois.—The mean temperature was 74.8°, or 2.2° above normal; the highest was 105°, at Centralia on the 23d, and the lowest, 32°, at Chemung and Lanark on the 9th. The average precipitation was 3.39, or 0.45 below normal; the greatest monthly amount, 7.76, occurred at Mount Pulaski, and the least, 0.91, at Cairo and Raum.

Very warm weather most of month, with frequent showers, improved crops in central district, especially corn, which has done well over most of the State. Grasses and oats did not improve much in the northern and southern districts on account of dry weather. A good average crop of wheat harvested.—*M. E. Blystone.*

Indiana.—The mean temperature was 73.4°, or 1.4° above normal; the highest was 103°, at Laporte on the 30th, and the lowest, 36°, at Auburn on the 3d. The average precipitation was 4.35, or 0.26 above normal; the greatest monthly amount, 8.14, occurred at Salem, and the least, 1.14, at Greensburg.

Cool weather and local rains nearly every day during the early part of June retarded the growth of crops. Corn looked yellow, and cut worms injured it in many fields. Wheat was heading; in many localities it was rank and had lodged; the fly also did much damage. Near the middle of the month tobacco was all transplanted and looked well. Oats grew nicely, and barley, rye, and clover matured slowly and well; in the southern counties they were nearly ready to cut. Late potatoes were being planted; early potatoes grew well, but the ground was too wet for cultivation. Meadows were short and full of white top. Vegetables were abundant. During the latter part of the month warm weather, with local rains, improved growing crops, but cultivation, haying, and harvesting, were delayed. In localities, heavy wind and large hail did much damage. The wheat and rye harvests began; the heads were well filled, promising good yields. In many localities, clover was all housed, and a fair crop of hay was being secured. Tobacco grew well. Oats were heading nicely. Cornfields were clean; much had been replanted and was small, but of good color. Fruits, except pears, were abundant; apples had continued to fall, although many still remained on the trees.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 72.3°, or 2.3° above normal; the highest was 106°, at Wapello on the 30th, and the lowest, 30°, at Larrabee on the 7th. The average precipitation was 3.71, or 0.55 below normal; the greatest monthly amount, 7.84, occurred at Logan, and the least, 1.05, at Columbus Junction.

First decade cooler than usual, and prevalence of cold nights checked germination; balance of month warmer, with unseasonable heat in closing decade. Conditions were generally favorable for corn, which was well cultivated and made rapid progress. Lack of moisture in eastern half of State prevented full development of spring grain crops and hay. Heat was intensified by high winds, causing rapid evaporation of the deficient moisture. Good crops of cherries and strawberries were produced; apples and plums much below average.—*John R. Sage.*

Kansas.—The mean temperature was 77.3°, or 3.5° above normal; the highest was 108°, at Hays City on the 29th, and the lowest, 37°, at Colby on the 1st and Achilles on the 6th. The average precipitation was 2.33 or 1.73 below normal; the greatest monthly amount, 6.50, occurred at Marion, and the least, 0.30, at Englewood.

Abundant rain in central counties, deficient over rest of State. Wheat harvest begun first week, nearly completed at close of month, with thrashing progressing, good yield, fine berry. Corn grew rapidly after first week, beginning to tassel last week, good condition. Oat harvest general last week, crop light. Pastures and meadows beginning to fail. First crop alfalfa cut and stacked first week, very fine crop; second crop cut last week, much lighter.—*T. B. Jennings.*

Kentucky.—The mean temperature was 75.6°, or 0.9° above normal; the highest was 104°, at Bowling Green on the 29th, and the lowest, 42°, at Eubank, Greensburg, and Vanceburg on the 1st and at Loretto on the 8th. The average precipitation was 3.97, or 0.37 below normal; the greatest monthly amount, 6.80, occurred at Manchester, and the least, 0.72, at Franklin.

The first ten days of the month were too cool for satisfactory advancement of crops, but nothing was injured permanently. Frequent showers occurred and tobacco setting progressed rapidly, the greater part being set by the 10th. From the 10th to the 25th the weather

was very favorable and all crops progressed rapidly. The last week was rather dry and at the close of the month some localities in the western portion were suffering somewhat from drought. Wheat was generally harvested during the last ten days of month.—*H. B. Hersey.*

Louisiana.—The mean temperature was 81.2°, or 1.6° above normal; the highest was 106°, at Alexandria on the 17th and Oak Ridge on the 24th, and the lowest, 53°, at Mansfield on the 2d. The average precipitation was 2.99, or 3.28 below normal; the greatest monthly amount, 7.74, occurred at Paincourtville, and the least, 0.25, at Ruston.

Showers, generally light and not sufficient for crop needs but fairly well distributed throughout the State, fell on the 4th, 5th, and 6th, from the latter date until about the beginning of the last week of the month drought prevailed. During the last week showers were frequent, well distributed, and copious in the southern parishes, lighter and less evenly distributed in the central portion of the State, and very light and scattered in the northern portion. Sugar cane made slow growth during the drought, but thorough cultivation kept the crop in good color and the fields clear of extraneous vegetation; cotton also stood the drought very well, but was small everywhere, and in the northern parishes the crop suffered. Providence rice and, in some localities where water in the bayous failed, irrigated rice was injured before the drought terminated. Corn and all other minor growing crops were materially injured, and the acreage of cowpeas and sweet potatoes was lessened by the protracted dry spell.—*W. T. Blythe.*

Maryland and Delaware.—The mean temperature was 71.1°, or 0.6° below normal; the highest was 102°, at Sharpsburg, Md., on the 29th and 30th, Hancock, Md., and Sudlersville, Md., on the 30th; and the lowest, 32°, at Deerpark, Md., on the 10th. The average precipitation was 3.14, or 0.20 below normal; the greatest monthly amount, 6.72, occurred at Maryland Agricultural College, Md., and the least, 0.70, at Johns Hopkins Hospital, Md.

The rains were unevenly distributed, but generally sufficient. Hot spell at close of month favored corn and hastened maturity of wheat, rye, and barley, but was slightly damaging to tobacco. Winter grain mostly saved; heavy straw, but heads light, and yields not satisfactory in east and south, although better in northern counties. Timothy and clover generally light crops. Fruit prospects slightly decreased by continued fall during the month; apples will be scarce, pears light to medium, and peaches fair to good; cherries yielded well. Shipments of peas and strawberries were heavy. Most minor crops in good condition, potatoes especially fine.—*Oliver L. Fassig.*

Michigan.—The mean temperature was 66.0°, or 1.5° above normal; the highest was 102°, at Traverse City on the 26th and 27th, and the lowest, 22°, at Ludington on the 1st, 3d, and 9th. The average precipitation was 2.51, or 0.72 below normal; the greatest monthly amount, 6.93, occurred at Calumet, and the least, trace, at Lake City.

The first half of the month was cool and retarded the germination and growth of corn, sugar beets, oats, and garden truck, although favorable for wheat, rye, and grass. During the latter half the temperature was above the normal and much more favorable for spring seeding. The precipitation was generally ample for most crops. High winds and frosts during the first decade did some damage to fruit. Frosts also injured some early corn and potatoes, but the damage was not serious or general.—*C. F. Schneider.*

Minnesota.—The mean temperature was 65.5°, or about normal; the highest was 99°, at Red Wing on the 26th, and the lowest, 26°, at Pokegama Falls on the 8th. The average precipitation was 5.81, or 1.68 above normal; the greatest monthly amount, 10.37, occurred at Leech Lake Dam, and the least, 2.50, at Rolling Green.

The month opened with late sown grain and crops on sandy land indicating need of rain, but abundant rains began on the 3d and continued at intervals during the month, supplying all the moisture the soil could absorb and flooding some lands in the Red River Valley. The temperature ranged from about the freezing point on the 7th to from 90° to 99° on the 25th and 26th. Wheat, oats, and barley were in good condition, and they were heading by the end of the month in all parts of the State. Corn was retarded and injured by the frosts of the 7th, and it continued backward till the moist and hot weather late in the month started a rapid growth. The flax was uneven, and much of it poor, especially in northern counties, where grasshoppers have affected it. Potatoes were generally very fine. Clover and timothy were short in the southeast, because of the early dry weather; elsewhere they were better. Hay making was attempted between rains late in the month. The aggregate damage by hail on different dates in the State was considerable.—*T. S. Outram.*

Mississippi.—The mean temperature was 80.4°, or 1.6° above normal; the highest was 104°, at Aberdeen on the 22d, 24th, and 26th, and at Brookhaven on the 28th, and the lowest, 47°, at Ripley on the 1st. The average precipitation was 2.33, or 2.58 below normal; the greatest monthly amount, 6.90, occurred at Windham, and the least, 0.16, at Pontotoc.

Maximum temperatures ranged above 90° from the 8th to the close of the month. The average rainfall was next to the lightest during the past fourteen years. Cotton, although from two to three weeks late, generally did well throughout the month, while early corn was seriously injured by the dry weather of the last two weeks.—*W. S. Belden.*

Missouri.—The mean temperature was 77.9°, or 4.1° above normal, the highest June mean during the past fourteen years; the highest was 110°, at Appleton City on the 26th, and the lowest, 40°, at Ironton on the 1st. The average precipitation was 2.13, or 2.79 below normal, the least amount recorded for any June during the past sixteen years; the greatest monthly amount, 5.31, occurred at Palmyra, and the least, 0.26, at Nevada.

In a majority of the central and southern counties of the State it was the driest June on record. Except in the extreme northern counties, where the rainfall was about normal, and in a few scattered localities in the central and southern sections, which were favored with several heavy showers during the fore part of the month, the drought, which had already become alarming at the close of May, continued with increased severity throughout the month of June. Over the greater part of the central and southwest sections and in a number of the northern and eastern counties the total precipitation for May and June, 1901, was less than 50 per cent of the normal, and at a considerable number of stations in the central and western sections it was less than 25 per cent, some localities receiving only 10 to 15 per cent. Where there was sufficient rainfall to keep the soil moist corn made good growth, but over the greater part of the State its progress was slow, and at the close of the month the crop was in a critical condition. Oats and meadows continued to deteriorate until at the end of the month it was estimated that little more than half the oats would be worth cutting, while timothy meadows promised only about one-third of a crop, many not being worth cutting. Many oats were too short to be cut with binders and were mown or pastured. Pastures became very dry and short, and at the close of the month some stock was being fed. Water also became scarce in many localities. Early potatoes were generally a very light crop, gardens were practically a failure, and apples dropped badly. The drought and consequent crop failure of 1901 will long be remembered as one of the worst in the history of Missouri.—*A. E. Hackett.*

Montana.—The mean temperature was 54.1°, or 5.5° above normal; the highest was 92°, at Glasgow on the 1st, and the lowest, 22°, at Adel on the 6th and Dell on the 5th and 9th. The average precipitation was 2.86, or 0.60 above normal; the greatest monthly amount, 7.42, occurred at Wibeaux, and the least, 0.04, at Manhattan.

Copious rains occurred in the east portion, where during the month of May there was a drought, which assures a fair hay crop for that section. Weather has been too cool for crops to make rapid growth.—*E. J. Glass.*

Nebraska.—The mean temperature was 70.7°, or 1.0° above normal; the highest was 109°, at Fairbury on the 28th, and the lowest, 26°, at Kennedy on the 7th. The average precipitation was 4.54, or 0.67 above normal; the greatest monthly amount, 13.27, occurred at Agee, and the least, 0.65, at Seneca.

A large excess in precipitation in the central and northern counties and a nearly equally large deficiency in southeastern and a portion of the southwestern counties makes crop conditions vary widely in the different sections of the State. Conditions were favorable for winter wheat and a large crop ripened rapidly during the last week of the month. Spring wheat and oats were considerably damaged by dry weather and insects in southern counties, but promise a good crop in northern. Corn has grown slowly and is small for the 1st of July, partially due to low temperature the first three weeks and partially to lack of moisture in southern counties. However, the crop was in thrifty condition at the end of the month. Hay promises a heavy crop in northern counties and a light one in southern.—*G. A. Loveland.*

Nevada.—The mean temperature was 59.1°, or 2.4° below normal; the highest was 99°, at Martins Ranch and Tybo, and the lowest, 21°, at Palmetto. The average precipitation was 0.02, or 0.27 below normal; the greatest monthly amount, 0.70, occurred at Hamilton, while none fell at several stations.

Warm days and cold nights characterized the weather of the month. Severe frosts on the 11th and 14th caused considerable damage in eastern and northern districts to alfalfa, fruit, potatoes, and garden truck. In portions of Elko County potatoes were cut to the ground and the fruit crop practically destroyed.—*J. H. Smith.*

New England.—The mean temperature was 65.8°, or 0.9° above normal; the highest was 101°, at Claremont, N. H., on the 28th, and the lowest, 30°, at Grafton, N. H., on the 17th. The average precipitation was 1.97, or 0.91 below normal; the greatest monthly amount, 6.55, occurred at Kineo, Maine, and the least, 0.25, at New Haven, Conn.

The first part of the month was cool, with much cloudiness, and frequent showers; the latter part generally fair, with a deficiency in precipitation, and the closing days were excessively warm. There were no severe or destructive storms, and, considered as a whole for the entire district, the weather of the month was favorable to crops.—*J. W. Smith.*

New Jersey.—The mean temperature was 70.0°, or 0.3° above normal; the highest was 103°, at Vineland on the 30th, and the lowest, 35°, at Charlotteburg on the 1st. The average precipitation was 1.57, or 1.97 below normal; the greatest monthly amount, 4.36, occurred at Toms River, and the least, 0.73, at Elizabeth.

The intensely hot weather during the last five days of the month intensified the droughty conditions that have prevailed in all sections

of the State; potatoes, oats, peas, and pastures suffering the most injury, while corn advanced very rapidly.—*E. W. McGann.*

New Mexico.—The mean temperature was 69.3°, or 0.8° below normal; the highest was 105°, at San Marcial on the 29th and 30th, and the lowest, 30°, at Folsom on the 6th. The average precipitation was 0.53, or 0.52 below normal; the greatest monthly amount, 2.64, occurred at Gallinas Springs, while none fell at Lordsburg, and only a trace at Deming, Fort Bayard, Los Lunas, Olio, and Silver City.

An unusually dry month. Owing to early rains growing crops suffered little from the drought, but toward the close of the month grass on the ranges had dried up considerably.—*R. M. Hardinge.*

New York.—The mean temperature was 66.7°, or 1.0° above normal; the highest was 100°, at Schenectady on the 29th, and the lowest, 26°, at Liberty on the 10th. The average precipitation was 3.35, or 0.13 below normal; the greatest monthly amount, 8.06, occurred at North Lake, and the least, 0.94, at New York, N. Y., and Primrose.

Showers, heavy in places, were frequent during the first ten days of June, causing a rapid growth of crops, but greatly delaying farm operations, particularly corn and potato planting, which was not finished until late in the month. The last half of month was favorable for crops and operations, during which time a large crop of excellent hay was being harvested under very favorable conditions. Wheat suffered a marked decline in parts of western New York by reason of the hessian fly, many correspondents reporting the crop as being entirely ruined. Apples will be very light, and pears and plums much less than an average crop, but peaches promise a good crop. The last part of the month was very dry and intensely hot, causing a splendid growth of potatoes and corn, which were, however, quite backward.—*R. G. Allen.*

North Carolina.—The mean temperature was 74.0°, or 0.4° below normal; the highest was 101°, at Washington on the 24th, and the lowest, 41°, at Highlands on the 1st. The average precipitation was 5.36, or 1.00 above normal; the greatest monthly amount, 11.67, occurred at Lenoir, and the least, 1.29, at Tarboro.

There were several periods of favorable weather during June, which enabled farmers to properly cultivate and clean their crops. The rainfall was beyond the needs of all crops, and although some improvement occurred, the general outlook is very unpromising.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 61.6°, or 1.8° below normal; the highest was 95°, at Steele on the 24th, and the lowest, 22°, at Ashley on the 7th. The average precipitation was 6.14, or 2.45 above normal; the greatest monthly amount, 9.71, occurred at Jamestown, and the least, 2.94, at Ashley.

The rainfall during the month, the heaviest on record, revived and improved all crops, which were suffering severely from drought. Some slight damage by hail and excessive rains at some widely separated points, but as a general thing the month was very favorable for crops.—*B. H. Bronson.*

Ohio.—The mean temperature was 70.9°, or 0.7° above normal; the highest was 103°, at Norwalk on the 27th, and the lowest, 30°, at New Waterford on the 9th. The average precipitation was 4.38, or 0.87 above normal; the greatest monthly amount, 10.97, occurred at New Lexington, and the least, 1.86, at Bellefontaine.

The first of month unusually cool, last part unusually warm. Precipitation excessive in central and southeastern counties. Cultivated corn, though small, is growing rapidly, but in many sections the fields are too wet to cultivate. Grains are badly tangled by high winds and rain, and rust has appeared. Fruit was unfavorably affected by the heat, and dropping increased.—*J. Warren Smith.*

Oklahoma and Indian Territories.—The mean temperature was 79.3°, or 2.3° above normal; the highest was 105°, at Prudence, Okla., on the 18th, and the lowest, 40°, at Kenton, Okla., on the 16th. The average precipitation was 1.97, or 1.35 below normal; the greatest monthly amount, 5.93, occurred at Jefferson, Okla., while none fell at Woodward, Okla.

Clear, hot weather, with high southerly winds, and a marked deficiency of rainfall characterized the month. Wheat, oats, and rye harvesting were completed. Good yields of wheat of fine quality were generally reported, while the yield of oats was very poor Crops, in general, were in fair condition at the close of the month, yet the need of rain was becoming very apparent. A very violent local thunderstorm passed over the western part of Kay County on the 7th, causing the death of three persons, and more or less serious injury to fifteen others. Considerable damage was also done to growing crops by hail, and to houses and barns by high winds.—*Charles M. Strong.*

Oregon.—The mean temperature was 57.7°, or 2.9° below normal; the highest was 98°, at Beulah on the 17th, and the lowest, 13°, at Silverlake on the 10th. The average precipitation was 1.07, or 0.32 below normal; the greatest monthly amount, 6.64, occurred at Government Camp, while none fell at Buckhorn Farm, P. Ranch, and Merlin.

The month was characterized by cloudy and unseasonably cool weather. In the Columbia River Valley and in eastern Oregon the mean temperature averaged nearly 4° below the normal, while the mean for the State as a whole was the lowest on record, except that of 1893. Temperatures several degrees below the freezing point occurred in eastern Oregon during the first decade, and gardens and tree fruit suffered considerable damage therefrom.—*Edward A. Beals.*

Pennsylvania.—The mean temperature was 69.1°, or 0.3° above normal; the highest was 103°, at York on the 30th, and the lowest, 32°, at Saegerstown on the 9th and Smethport on the 10th. The average precipitation was 3.47, or 0.70 below normal; the greatest monthly amount, 7.61, occurred at Uniontown, and the least, 0.88, at Point Pleasant.

From the 9th to the 10th the coolest weather of the month prevailed throughout the State, except in the extreme southeast portion. During the last of the month an increase of temperature was general over the State, and especially hot weather prevailed on the 28th, 29th, and 30th. The rainfall was heaviest in the western portion of the State; there were five rainy periods over all of Pennsylvania, but in the Ohio basin they were of longer duration after the 11th of the month and, in fact, the last twenty days were unusually wet in that section, the greater portion of the precipitation being in the form of thundershowers. In the Susquehanna basin showers were fairly frequent after the 13th, but fair days were more numerous than in the Ohio basin, while in the Delaware basin the most general rains were on the 1st, 2d, 3d, 7th, 15th, 21st, 27th, and 28th. Farm work was frequently interrupted by the rains, but the weather was generally propitious for growing crops. Haying was in progress at the close of the month and an average yield was being obtained. Wheat and rye made good progress and these crops are good, except in some localities where lodged by heavy rains and damaged by the hessian fly. The oat crop is very generally affected by rust. Corn and potatoes are good but the former is late. Buckwheat sowing received considerable attention; the acreage will be large. Apples are dropping, but other fruits are doing very well.—*T. F. Townsend.*

Porto Rico.—The mean temperature was 79.7°, or about normal; the highest was 98°, at Arecibo on the 12th and at Juana Diaz on the 24th, and the lowest, 58°, at Ponce on the 17th. The average precipitation was 8.11, or 2.96 above normal; the greatest monthly amount, 25.34, occurred at Hacienda Perla, and the least, 0.72, at Ponce.

The weather has been generally favorable for farm work, and good progress has been made, except in the Ponce and eastern San German districts, where the drought has continued. Grinding of cane is practically over. Corn is being harvested in good quantities. Coffee is beginning to ripen and a good crop is promised. The bean crop was almost a total loss. Small crops are abundant in nearly all districts. All growing crops are doing well.—*E. C. Thompson.*

South Carolina.—The mean temperature was 76.7°, or 1.4° below normal; the highest was 102°, at Batesburg on the 24th, and the lowest, 48°, at Walhalla on the 1st. The average precipitation was 6.55, or 2.02 above normal; the greatest monthly amount, 11.92, occurred at Pinopolis, and the least, 3.60, at Walhalla.

The temperature during June was favorable for crop growth, but the excessive rainfall largely prevented cultivation, so that fields became foul with grass and weeds. There was also too much moisture for the normal development of field crops. On river bottoms crops were extensively damaged by floods. The condition of all crops was poor at the close of the month, especially corn and cotton.—*J. W. Bauer.*

South Dakota.—The mean temperature was 66.3°, or 1.0° below normal; the highest was 100°, at Menno on the 26th, and the lowest, 24°, at Leola on the 7th. The average precipitation was 6.29, or 2.97 above normal; the greatest monthly amount, 11.62, occurred at Greenwood, and the least, 3.73, at Milbank.

Heavy to killing frost on the 7th over much of the eastern portion of the State seriously damaged many fields of early corn—a number irreparably—also some potatoes and millet, and materially reduced the fruit prospect. Excessive rains occurred in many localities, on some lowlands injury to crops resulting therefrom. Generally the conditions were favorable for spring wheat, oats, barley, rye, and grass crops, but until the latter part of the month unfavorable for corn. Several farm dwellings and some barns and outbuildings were destroyed or damaged and about a dozen persons injured by winds of tornadic nature over limited areas in Beadle, Kingsbury, and Pennington counties, and local gales of sufficient intensity to damage small outbuildings occurred in several other localities. There was some local damage to crops by hail.—*S. W. Glenn.*

Tennessee.—The mean temperature was 76.3°, or 1.1° above normal; the highest was 105°, at Dyersburg on the 28th, and the lowest, 39°, at Erasmus on the 1st. The average precipitation was 3.11, or 1.42 below normal; the greatest monthly amount, 8.40, occurred at Andersonville, and the least, 0.19, at Dover.

The weather of the month was, on the whole, favorable to the growth of crops, and farm work progressed well. The average rainfall was decidedly below the normal, and toward the end of the month crops generally were beginning to suffer from lack of moisture; also, the very high temperature of the last ten days was severe on some crops. During the haying and harvesting season the weather was very favorable.—*H. C. Bate.*

Texas.—The mean temperature was 81.6°, or 1.1° above normal; the highest was 108°, at College Station on the 17th and Haskell on the 18th, and the lowest, 49°, at Amarillo on the 15th. The average precipitation was 1.27, or 2.39 below normal; the greatest monthly amount, 5.41, occurred at Nacogdoches, while none fell at Dublin, Haskell, and Sanderson.

Cool weather at the opening of the month was unfavorable for the germination and growth of cotton. By the middle of the month the

crop was fruiting generally. The crop is in an excellent state of cultivation but needs rain. The plant is small, irregular, and, as a rule, ten days late. Cotton on upland is suffering, while on lowland the crop is holding out well. The dry weather has been very unfavorable for corn. Early corn has matured a good crop in some localities over the State, but, as a rule, it is very light. In some places much of the crop was cut for forage. The yield will be considerably below the average. Water for irrigating rice has not been sufficient for the needs of the crop in all localities, and in some places it has suffered. Rice which was dependent on rainfall for water is almost a failure.—*I. M. Cline.*

Utah.—The mean temperature was 63.3°, or 2.4° below normal; the highest was 109°, at Green River on the 30th, and the lowest, 19°, at Loa on the 14th. The average precipitation was 0.25, or 0.15 below normal; the greatest monthly amount, 0.97, occurred at Frisco, while none fell at Cisco, Promontory, St. George, and Terrace.

Dry farm wheat was badly damaged by the drought of the latter half of the month. Irrigated crops made fair advancement and were in good condition at the close of the month.—*L. H. Murdoch.*

Virginia.—The mean temperature was 72.3°, or 1.1° above normal; the highest was 103°, at Stephens City on the 30th, and the lowest, 40°, at Burkes Garden on the 1st. The average precipitation was 5.05, or 1.10 above normal; the greatest monthly amount, 14.37, occurred at Dale Enterprise, and the least, 1.40, at Ashland.

The month opened with wet weather prevailing and soil sodden. This was followed by bright, warm weather, during which crops made excellent growth and farm work was much advanced. After the 20th the weather became hot and the month closed with a heat wave of great severity prevailing. Wheat matured and harvesting was general during the latter half of the month.—*Edward A. Evans.*

Washington.—The mean temperature was 56.3°, or 3.8° below normal; the highest was 99°, at Pasco on the 18th, and the lowest, 26°, at Lind on the 5th. The average precipitation was 1.94, or 0.22 above normal; the greatest monthly amount, 8.33, occurred at Montecristo, and the least, 0.25, at Pasco.

The extraordinary coolness of the month prevented rapid growth and made corn and vegetables very backward, but the ample supply of rain and cool weather at filling season was very favorable for wheat. There was no good haying weather except in the eastern section.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 70.7°, or 0.2° above normal; the highest was 104°, at Creston on the 30th, and the lowest, 32°, at Philippi on the 2d. The average precipitation was 5.67, or 1.38 above normal; the greatest monthly amount, 11.10, occurred at Spencer, and the least, 1.37, at Magnolia.

At the close of month wheat was filling well, although rather thin on the ground, and was beginning to turn with prospect of fair yield; meadows had improved but were weedy; oats were heading and corn was growing fast, but needed cultivation; early potatoes were promising, but late ones were not so good; apples had deteriorated considerably by dropping, but the prospect for peaches was excellent.—*E. C. Vose.*

Wisconsin.—The mean temperature was 67.4°, or about normal; the highest was 103°, at Brodhead on the 25th, and the lowest, 26°, at Medford on the 8th. The average precipitation was 4.17, or 0.16 below normal; the greatest monthly amount, 8.68, occurred at Ashland, and the least, 1.12, at Milwaukee.

Month moderately cool until last decade when extremely high temperatures occurred generally. Precipitation largely in excess of the normal over central and northern sections, while in the southern section the lack of rain was a serious menace to crops. Crops generally satisfactory, except along southern border, where the drought was becoming quite serious at the close of the month.—*W. M. Wilson.*

Wyoming.—The mean temperature was 57.5°, or 2.4° below normal; the highest was 98°, at Fort Laramie on the 29th, and the lowest, 20°, at Fort Yellowstone and Evanston on the 5th. The average precipitation was 1.79, or 0.19 above normal; the greatest monthly amount, 3.92, occurred at Parkman, and the least, 0.20, at Hyattville.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

SUN SPOTS AND THE WEATHER.

By H. H. KIMBALL, U. S Weather Bureau.

Numerous attempts have been made to show a relation between the variations in sun-spot frequency and the departures from normal weather conditions on our globe. Of these we need for the present only mention the following:

In 1880, Mr. Fred. Chambers[1] presented tables and diagrams showing that at certain stations within the Tropics there exists a periodicity of about eleven years in the curve representing the secular variations in the barometer, corresponding to the 11-year period in the curve of sun-spot frequency, the maximum of the pressure curve occurring at the time of minimum sun-spot frequency, and vice versa. He also undertook to show that a maximum of pressure was followed by a minimum of rainfall, and consequently by famines in India, but his deductions were questioned by Mr. E. Douglas Archibald, who showed that winter rains were quite apt to be abundant in northern India after a period of maximum pressure, and that no one rule could therefore be applied to the whole of India.

In 1894, Mr. W. L. Dallas,[2] after first accepting the theory that years of maximum sun spots are years of maximum solar radiation, advanced the theory that these years should also be years of increased activity in the atmospheric circulation, since, as is well known, the general circulation depends primarily upon a difference of temperature between the equator and the poles. Likewise, since years of maximum heat should be years of maximum evaporation, they should also be years of maximum rainfall, and this latter circumstance would exert such a modifying influence on the temperature of a country like India that the relative heating effect of the sun for the different years of the cycle might be entirely obliterated. Since the effects of the variations in the radiation from the sun could apparently best be studied in a tropical region as little under the influence of local conditions as possible, he selected for discussion observations taken on shipboard in the Bay of Bengal, and presented tables and diagrams showing in general the existence of a cycle of eleven years in the pressure and temperature variations. His pressure curve has the same general characteristics as that of Chambers, and his curve of temperature fluctuations coincides in a general way with the sun-spot curve, in that the years of maximum and minimum temperature occur at about the same time as the years of maximum and minimum sun spots.

In 1898, Prof. F. H. Bigelow presented a diagram[3] showing the relations between areas of sun spots, terrestrial magnetism, and certain elements of American weather for the years 1878–1893. His curves, showing the variations in sun-spot areas, terrestrial magnetism, and the barometric pressure for selected American stations, agree quite closely in their phases and characteristics, but the temperature curve is the reverse of these, the years of maximum temperature occurring during years of minimum sun spots, and vice versa. This is contrary to the relation found by Chambers in the Tropics, but is consistant with the modifications that Dallas pointed out might be introduced by local influences. Bigelow's theory of the relation between sun spots and the weather is, however, very different from the others we have mentioned.

In 1900, Sir Norman Lockyer and his son Dr. W. J. S. Lockyer presented to the Royal Society some conclusions[4]

[1] Abnormal variations of barometric pressure in the Tropics, and their relation to sun spots, rainfall, and famine. Nature, Vol. XXIII, pp. 88, 107, and 399.

[2] The relations between sun spots and weather as shown by meteorological observations taken on board ship in the Bay of Bengal during the years 1856 to 1879. Indian Meteorological Memoirs, Vol. VI, Part I, No. 1.

[3] Abstract of a report on solar and terrestrial magnetism in their relation to meteorology. W. B. Bulletin No. 21, p. 125.

[4] On solar changes of temperature and variations in rainfall in the region surrounding the Indian Ocean. Nature, volumn 63, pp. 107 and 128.

on the relations between sun spots and rainfall, based upon a study of the lines in the spectrum of sun spots and of the rainfall data of India, which may be summarized as follows:

(1) The sun is warmest at sun-spot maximum and coolest at sun-spot minimum.

(2) In India there is a maximum of rainfall at about the time of sun-spot maximum, and a secondary maximum at about the time of sun-spot minimum. In Mauritius there is a maximum of rainfall at the time of minimum sun spots.

(3) The dates of the beginning of the pulses in the rainfall of India and the Mauritius are related to the sudden remarkable changes in the behavior of the widened lines in the spectrum of sun spots.

(4) All the famines that have devastated India during the last half century have occurred in the intervals between the two pulses.

(5) Important variations are found in (1) the widened lines, (2) the rainfall of India, and (3) the Mauritius in connection with the maximum of 1893 as compared with the maximum of 1883; but the minimum of 1888–89 resembles the previous minimum of 1878–79.

(6) The lowest stages of the Nile have occurred between the same intervals as the Indian famines.

(7) The relation of the intervals in question to the droughts of Australia and Cape Colony and to the variations in rainfall in extra-tropical regions generally has not yet been investigated.

(8) Mr. John Eliot states that these deductions accord closely with the known facts of the abnormal features of the rainfall, temperature, and pressure of India during the past twenty-five years, and will be of great service in forecasting future famines.

At the time of maximum sun spots many of the widened lines of the spectrum of the spots can not be identified by means of charts of the lines of the solar spectrum, perhaps because they are enhanced, or high temperature lines. At any rate, the coincidence in the time of the occurrence of the maximum of sun spots and the maximum of these unknown lines, together with the increase in the number of eruptive prominences in the lower latitudes of the sun, is considered evidence that at this time the solar temperature reaches a maximum. The known lines of sun-spot spectrum reach a maximum when sun spots and eruptive prominences are at a minimum and when the solar heat is also supposed to be at a minimum. The curves representing the frequency of the known and unknown lines are very much flattened at the time of their maximum and minimum phases, and at some intermediate point they cross at quite a sharp angle. It is after these crossings, when either the known or unknown lines are on the increase, that the rainfall pulses have occurred, and it is previous to this, when the number of known and unknown lines is not changing perceptibly, that the Indian famines have occurred.

Ordinarily the crossings occur every five or six years, or twice during each 11-year cycle, as will be seen from the following table, which also shows the relation between the rainfall pulses for India and such crossings as have occurred since the known and unknown lines have been carefully observed and plotted.

	Years.			
Crossings	1881	1886	1892	
Rain pulses	1881–84	1887–90	1891–94	
Indian famines	1879–81	1884–86	1890–92	1896–97, 1899

The crossing that we would expect in 1897 has not yet occurred, showing that the interval between crossings is by no means regular. But the unprecedented famine of 1899 accords with the theory that the rain pulses commence at about the time of a crossing of the known and unknown lines and are of limited duration, and that in consequence famines may be expected during the years just preceding a crossing, and will be especially severe whenever the crossings are delayed.

A popular presentation of these facts, by Sir Norman Lockyer, in the North American Review for June, 1901, appears to have attracted a great deal of attention, and some inquiries and many clippings on the subject have found their way to the Weather Bureau. As is so often the case, many of the newspaper correspondents appear to have misunderstood the real object of these scientific investigations, which was, as stated by the Lockyers, to see if sun spots would aid in predicting the occurrence of famines in India. Except in a few cases they have not been able to study the relations between the crossings of the known and unknown lines of the spectrum of sun spots and the rainfall outside of India. In the valleys of the Nile and the Mississippi rivers they found evidence of rain pulses such as occur in India, while at other places no such pulses could be detected. Evidently, therefore, it is claiming too much, and certainly more than the Lockyers intended, to say that any general relation between sun spots, temperature, and rainfall, has been discovered that will apply to all regions of the globe. Neither are the claims that have been advanced by others consistent, since in one case we find the excessive heat of the summer of 1900 attributed to the general absence of sun spots, while in another case the absence of these spots is advanced as an indication of a cool, wet summer for this year.

That a very conservative attitude is maintained by Weather Bureau officials toward this question, is indicated by the following reply by the Chief of Bureau, dated June 13, 1901, to a letter from Maj. Henry Hammond, Beech Island, S. C., inquiring if the cold and wet weather of that section during the present season can be attributed to the 11-year sun-spot cycle:

June 21, 1901.

DEAR SIR: * * * I beg to advise you that the only relation between sun spots and terrestrial weather that appears to be definitely fixed is an increase in the number and violence of magnetic storms corresponding to years of maximum sun spots. No connection has thus far been shown between the spottedness of the sun and the fall of rain on this planet.

The low temperatures and the preponderance of rain in the South Atlantic States are due mainly to the paths taken by areas of low pressure moving across the United States from west to east. If in winter and spring these traveling areas of low pressure take a southerly course or move from the Gulf northeastwardly over the South Atlantic States, the weather will be cold and showery. If, on the other hand, the pressure is such that areas of high pressure move southeastwardly from the Lake region and lodge off the South Atlantic States, forming a semipermanent high in that region, warm, pleasant weather will result. During the month of May and thus far during June pressure has been remarkably low over the South Atlantic States, and there has been a relatively large number of rainy days. This condition is not a permanent one. In the ordinary course of events it should give way to the normal conditions for the season and the latitude.

AN INSTANCE OF BALL LIGHTNING AT SEA.

By ROBERT SEYBOTH, U. S. Weather Bureau.

The description in a local paper of a recent display of ball lightning near Cumberland, Md., has induced the present writer to relate his personal experience with this rare phenomenon, of whose strange vagaries no satisfactory explanation has as yet been offered, and the actual occurrence of which has sometimes been doubted. It is indeed difficult to formulate a theory that will cover all the peculiar manifestations attributed to ball lightning, especially as regards shape, color, slow and erratic movement, and, finally, explosive effects.

But whether all its visual manifestations are physical realities, or whether they are partly the result of an optical illu-

sion, the occurrence and destructive effects of ball lightning can not be doubted, as has been attested by numerous witnesses, and made unpleasantly patent to the writer of the following narrative.

The summer of 1867 found me, then a mere boy, aboard the New Bedford whaling bark *Orray Taft*, outbound from the desolate harbor of Marble Island, in the northwestern corner of Hudson Bay, where the vessel had wintered in the ice from September until June, and whence she had resumed her cruise in Arctic waters after "blubber and bone." On the night of June 30 to July 1 the bark encountered a genuine hurricane, with the (for the latitude) unusual phenomenon of a violent thunderstorm. A rock-bound lee shore and the presence of floe ice in large quantities, with an occasional berg, necessitated the carrying of all the sail possible, in order to "claw off" from the rocks on the one hand, and steer clear of the madly heaving and tumbling ice masses on the other. At about 2 a. m. wind and rain ceased with startling suddenness, and the sky showed signs of clearing, though a portentous cumulus cloud or "thunderhead" still hung low over the troubled waters.

The sudden cessation of the uproar, together with the violent pitching and rolling of the ship, brought the captain to the companion hatch, whence he shouted the emphatic order "Stand by to wear ship," adding, somewhat profanely, "We'll catch h— presently from the opposite quarter." Inured as the crew of a whaler is sure to become to unusual and critical situations, and apathetic as the writer felt to the peril of the present one, he nevertheless had a distinctly uncanny sensation at this sudden transition from howling hurricane to dead calm, associated with a large degree of skepticism at the captain's assurance in predicting and preparing for a still more violent change to come; for he had never before passed through the center of a cyclone, and his theoretical knowledge of the laws of storms was decidedly limited. But the man or boy who, aboard a whaler, would let skepticism stand in the way of his prompt compliance with an order from the captain would find his berth an exceedingly unhealthy one, and would most likely have cause to regret the day of his birth; so all hands rushed to their proper stations, to "stand by and haul," as and when directed. Happening to secure the upper hold on the fore-topsail brace, the writer facing sternward, again noticed the evil-looking thunderhead apparently but a few yards above the mizzen truck, and, while waiting in silent expectancy for the things to come, saw a ball of fire, the size of a man's head, detach itself from the cloud and sail quite leisurely to the mizzen truck, striking which it exploded with a deafening crash and sent a shower of hissing sparks over rigging and deck.

Of the immediate consequences, save one, the writer can only speak from hearsay. When he regained consciousness, he found himself sitting, propped up against the weather side of the mainmast, paralyzed in the right half of his body, and his shipmates busily engaged, some in clearing away the wreckage of the shattered mizzenmast, others in sounding the pump to discover whether or not the bolt had knocked a hole in the vessel's bottom. The latter calamity was probably averted by the fact that the lightning had found an easier escape to the water by way of the anchor chains through the hawsepipes, as both anchors had been made ready to let drop in case of the vessel's inability to weather the rocks. The one exception above noted, and which he has accepted as a proof that the velocity of thought is greater than that of lightning, was his distinct realization, at the critical moment, that he had been struck by lightning and was being hurled to the deck, though consciousness failed him before he struck it. He also had time to formulate the thought, "Well, it is all over with you this time," and feel rather gratified at the supposed fact. There was absolutely no pain felt, not even an unpleasant sensation; on the contrary, he seemed to sink into an agreeably restful position, though, according to his shipmates' statements, he was hurled with great violence into the lee scuppers. Of the other men on deck, especially those having hold of the brace, every one was more or less shocked, but none were rendered insensible. The writer's uppermost hold on the rope had evidently deflected the greater part of the charge through his body. The paralysis of his right side was gradually succeeded by a prickling, tingling sensation, and the movement of his limbs had again become possible by the time the watch was told to go below. His former skepticism of the captain's prognostication had to be atoned for by a mental apology, for the hurricane began with increased fury, and from the opposite quarter, almost immediately after the lightning had struck the mast.

One rather amusing story was told of the third mate, whose station in wearing ship was forward of the windlass. Standing inside of a big coil of the anchor chain, along which the lightning flew so that it looked like a huge fiery serpent, the mate was said to have been swiftly turned around his own axis a number of times, looking more like a dancing dervish than a grim old tar, while the lightning followed the convolutions of the coil. When he had regained his breath, the profanity of the veteran whaleman was said to have bordered on the sublime.

At a later period, while in charge of the newly-established Signal Service station on the summit of Pikes Peak, the writer had ample opportunity to familiarize himself with many different manifestations of atmospheric electricity, but never again has he witnessed that mysterious and weird phenomenon known as ball lightning.

THE CLIMATE OF HARPOOT, TURKEY, IN ASIA.

By Prof. ELLSWORTH HUNTINGTON, Euphrates College, Harpoot, dated April 13, 1901.

The accompanying tables[1] show the climatic conditions of Harpoot, Turkey, in Asia, for the last three years. Harpoot is situated at the elevation of 4,550 feet near the top of a small mountain range, in latitude 38° 20′ north, longitude 39° 20′ east. Twenty miles to south are the Taurus Mountains, from 6,000 to 7,500 feet high. Fifty miles north is the Anti-Taurus Range, with an elevation of 10,000 feet. The part of the United States which most resemble Harpoot in climate and in many physical features is Colorado.

The central fact of the climate of this part of the world is the long dry season. Around Harpoot it lasts from the middle of June to the middle of October, four months. During this time there are almost no clouds, the average relative humidity is under 50 per cent, and dew is never formed. The heat is not usually excessive, and during two-thirds of the time the wind blows from the north or northwest. Dur-

[1] On December 22, 1897, Professor Huntington wrote to the Chief of the Weather Bureau from Euphrates College, Harpoot, saying that he had lately come to that place from the United States and was keeping a meteorological record and would try to induce those at other mission stations, ten or twelve in number, to keep a simple record of weather and rainfall. It may, therefore, be assumed that the data given in the following Table 1 represents the observations made by himself at Euphrates College. Professor Huntington says that no observations of the barometer are included because he has only an aneroid. The mean maximum and mean minimum temperatures are not given because two sets of thermometers were broken in transit and a third is now in use. The records kindly sent to the Weather Bureau from Mersivan by Prof. J. J. Manissadjian for the years 1892–1896 will be found on page 245 of the MONTHLY WEATHER REVIEW for June, 1897. The Editor can but hope that Professor Huntington will succeed in obtaining equally good records from all the mission stations in Asia Minor, and thus contribute greatly to our knowledge of the meteorology of that region. Special efforts should be made to secure continuously recording thermographs and barographs for some of these stations, such as are sold by Richard Frères in Paris at a low price and can be easily transported.

TABLE 1.—*Summary of weather record at Harpoot, Turkey, in Asia*, 1898–1900.

Latitude 38° 40′ north; longitude 39° 20′ east. Elevation, 4,550 feet.

1898.	Temperature.										Relative humidity, 2 p. m.	Dew-point, 2 p. m.	Precipitation, inches.			Mean cloudiness, per cent.	Prevailing wind.	Number of days.					Thunderstorms.	1898.
	7 a. m.	2 p. m.	9 p. m.	Mean.	Max.*	Date.*	Min.*	Date.*	Mean daily change.	Max. daily change.			Rain.	Snow.	Max. in 24 hours.			Clear.	Fair.	Cloudy.	With .01 in. precip.	Fog at Harpoot.		
January	14.9	21.5	17.0	17.6	33	7	0	28	2.91	14.5	88.9[a]	18.2[a]	1.59	15.9	0.40	28	n.	20	2	9	8	1	0	January.
February ...	28.0	33.2	29.9	30.3	42	11	13	1	2.62	10.5	78.1[e]	28.2[e]	1.80	8.0	1.20	67	e.	4	7	17	6	1	0	February.
March.....	31.3	40.9	34.9	35.5	59	28	10	12	2.32	10.9	68.1	28.7	3.78	23.2	0.95	53	e.	10	7	14	13	0	2	March.
April	46.0	56.8	49.8	50.6	72	23	30	§	4.02	13.5	51.8[m]	35.8[m]	2.66	0.5	1.29	49	nw.	7	14	9	5	0	1	April.
May	54.1	66.0[a]	56.7[c]	58.4	76	11	35	4	2.83	8.7	38.7[a]	39.0[a]	1.31	0.0	0.52	34	nw.	13	16	2	8	0	11	May.
June	59.9	73.7[a]	65.3	66.1	84	26, 30	42	23	3.75	11.3	32.6[a]	44.0[a]	0.10	0.0	0.07	18	n.	23	6	1	2	0	2	June.
July.....	73.7[b]	87.5[b]	78.5[b]	79.5	94	30	63	3, 7	2.10	3.8	35 0[j]	55.7[j]	0 02	0.0	0.02	2	n.	31	0	0	1	0	0	July.
August.....	69.0[b]	84.9[c]	75.2[b]	76.1	92	18	58	29	1.75	8.1	26.1[j]	41.5[j]	0.00	0.0	0.00	0	n.	31	0	0	0	0	0	August.
September..	60.3[d]	75.6[c]	66.6[a]	67.3	84	2	48	10	3.15	8.8	33.5[k]	44.3[k]	0.00	0.0	0.00	2	n.	30	0	0	0	0	0	September.
October.....	55.6	66.6[b]	59.3	60.2	78	1, 2	35	13	2.88	13.0	44.1[c]	40.5[c]	1.29	0.0	0.69	18	n.	23	2	6	4	0	3	October.
November ..	38.5[a]	49.2[a]	41.6	42.7	64	1, 2	18	23	2.30	9.2	27.9[a]	23.4[a]	0.58	4.5	0.40	25	n.	20	4	6	3	1	0	November.
December...	28.0	35.0	30.4	30.9	50	1	12	25	2.69	17.5	68.9[b]	25.8[b]	2.99	19.7	1.12	35	e.	19	1	11	10	0	0	December.
Average...	46.6	57.6	50.4	51.3	94†	.....	0†	.....	2.78	17.5†	49.5	35.4	16.12‡	71.8‡	1.29†	27	n.	231‡	59‡	75‡	60‡	8‡	19‡	Average.
1899.																								
January.....	22.5	29.6	24.6	25.3	36	17	10	3	2.75	8.1	75.1	24.7	1.73	15.3	0.70	56	n.	12	3	16	10	1	0	1899.
February....	27.8	34.7	29.5	30.4	42	13, 14	16	22	3.08	7.3	73.9[a]	28.7[a]	4.23	31.2	1.30	67	e.	7	3	18	13	1	0	January.
March ..	31.3	40.5	35.0	35.4	60	27	15	1, 2	2.51	10.3	67.3[d]	30.0[d]	3.77	12.1	2.12	44	e.	14	5	12	9	0	1	February.
April	45.6	55.7	48.7	49.7	72	18, 19	30	1	2.28	9.5	54.5[d]	36.0[d]	2.71	3.2	1.18	47	se.	11	7	12	16	0	5	March.
May	57.4	69.4[b]	61.4	62.4	86	31	43	5	3.11	9.4	38.6[b]	40.7[b]	2.17	0.0	0.93	24	nw.	19	8	4	9	0	4	April.
June	62.5	76.1	66.6	67.9	88	§	47	14	3.46	13.5	31.4[a]	42.1[a]	1.11	0.0	1.00	19	nw.	21	5	4	5	0	2	May.
July.....	69.9[c]	86.4[j]	77.6†	77.8	93	6	56	1	.....	.....	25.5[a]	46.3[a]	0.00	0.0	0.00	3	n.	31	0	0	0	0	0	June.
August... ...	70.3[c]	84.2[c]	75.1[j]	76.2	94	5	57	17	2.31	8.7	35.5[b]	52.1[b]	0.00	0 0	0.00	8	n.	31	0	0	0	0	0	July.
September..	65.8	79.8[c]	70.7[c]	71.7	87	2	56	6	2.20	9.0	39.6[j]	50.8[j]	0.07	0.0	0.06	12	n.	26	2	2	2	0	1	August.
October.....	49.1[a]	58.6	52.2	53.0	78	1	31	28	3.64	22.8	66.9	44.7	5.55	0.0	2.26	35	n.	13	9	9	17	0	10	September.
November ..	38.2	47.5[a]	41.5	42.2	58	1, 5	18	28	2.33	13.5	63.1[c]	34.8[c]	1.44	0.1	0.60	40	n.	13	8	9	6	0	0	October.
December...	22.6	27.6	24.2	24.7	42	2	8	22	2.54	14.6	85.0[a]	23.9[a]	3.07	26.9	1.00	73	e.	5	4	22	18	10	0	November.
Average...	46.9	57.5	50.6	51.4	94†	.....	8†	.....	2.75	22.8†	54.7	37.9	25.85‡	88.6‡	2.26†	35	n.	208‡	54‡	108‡	105‡	12‡	23‡	December.
																								Average.
1900.																								
January.....	26.4	32.5	28 3	28.9	40	18	18	22	2.32	7.5	78.8[f]	27.2[f]	0.64	5.8	0.30	64	e.	9	2	20	8	6	0	1900.
February....	31.0	37.9	33.9	34.2	48	22	18	6, 7	1.87	7.0	79.9	32.1	2.19	0.0	0.47	81	e.	1	5	22	8	6	0	January.
March.....	35.2	42.5	38.6	38 7	57	31	14	11	2.98	9.5	75.8[a]	34.7[a]	6.05	8.0	1.63	73	e.	3	9	19	16	0	2	February.
April	46.4[b]	56.8[f]	50.2	50.9	69	23	38	14	2.78	6.0	47.5[e]	37.7[e]	1.09	0.0	0.61	37	se.	12	11	7	9	0	1	March.
May	53.4	64.5[a]	56.7	57.8	72	§	41	3	2.99	6.2	44.0[a]	41.7[a]	1.98	0.0	0.69	45	nw.	10	12	9	12	0	2	April.
June..... ..	60.2[a]	72.8[b]	65.0[a]	65.7	82	1	46	15, 16	3.75	14.7	39.5[d]	45.2[d]	1.55	0.0	0.92	17	nw.	21	5	4	6	0	6	May.
July.....	71.2[a]	82.2[c]	75.4	76.0	91	13	63	5	2.42	5.8	26.8[b]	43.2[b]	0.00	0.0	0.00	5	n.	29	2	0	0	0	0	June.
August	70.4	82.9[b]	74.5[j]	75.6	90	16	62	29	2.52	6.2	27.1[c]	43.5[c]	0.07	0.0	0.07	4	nw.	29	2	0	1	0	1	July.
September..	60.0[b]	73.1[j]	64.2[b]	65.4	85	1	49	16	2.44	8.5	31.1[m]	38 0[m]	0.44	0.0	0.27	10	nw.	26	2	2	3	0	1	August.
October	52.7	64.9	57.8	58.2	76	5	41	27	2.35	9.7	47.5[b]	42.2[b]	0.80	0.0	0.34	27	nw.	21	5	5	5	0	4	September.
November ..	37.6[d]	47.5[c]	41.3[b]	42.0	59	1	33	9, 12	1.78	10.0	53.6[j]	29.4[d]	0.37	0,0	0.36	29	nw.	20	2	8	2	0	0	October.
December...	32.2[b]	37.0[b]	33.7[b]	34.2	49	3	20	28, 29	1.96	6.5	85.1[c]	32.9[c]	2.92	7.2	0.97	62	e.	8	5	18	10	5	0	November.
Average...	48.1	57.9	51.6	52.4	91†	.....	14†	.....	2.51	14.7†	53.1	37.7	18.10‡	21.0‡	1.63†	38	nw.	189‡	62‡	114‡	88‡	17‡	17‡	December.
																								Average
AVERAGE FOR 1898–1900.																								
January.....	21.3	27.9	23.3	23.9	40	.....	0	.....	2.66	14.5	78.8	24.5	1.32	12.3	0.70	50	e.	14	2	15	9	3	0	January.
February....	28.9	35.3	31.1	31.6	48	.....	13	.....	2.52	10.5	77.3	29.7	2.74	12.0	1.30	72	e.	4	5	19	9	3	0	February.
March.....	32.6	41.3	36.2	36.6	60	.....	10	.....	2.60	10.9	70.4	31.1	4.52	14.4	2.12	57	e.	9	7	15	13	0	2	March.
April	46.0	56.4	49.6	50.4	72	.....	30	.....	3.03	13.5	51.6	35.6	2.15	1.2	1.29	44	se.	10	11	9	10	0	2	April.
May	55.0	66.6	58.3	59.5	86	.....	35	.....	2.98	9.4	40.4	40.6	1.82	0.0	0.93	35	nw.	14	12	5	10	0	6	May.
June.....	60.9	74.2	65.6	66.6	88	.....	42	.....	3.65	14.7	34.5	43.8	0.92	0.0	1.00	17	nw.	22	5	3	4	0	3	June.
July	71.5	85 2	77.0	77.7	94	.....	56	.....	2.26	5.8	29.4	48.5	0.01	0.0	0.02	3	n.	30	1	0	0	0	0	July.
August.....	69.9	82.9	73.6	75.0	94	.....	57	.....	2.19	8.7	28.4	44.3	0.02	0.0	0.07	2	n.	30	1	0	0	0	0	August.
September..	61.6	76.5	67.3	68.2	87	.....	48	.....	2.60	9.0	35.0	45.1	0.17	0.0	0.27	8	n.	27	2	1	2	0	1	September.
October.....	52.4	63.4	56.5	57.2	78	.....	31	.....	2.96	22.8	52.8	42.5	2.55	0.0	2.26	27	n.	19	5	7	9	0	6	October.
November ..	38.1	48.1	41.1	42.3	64	.....	18	.....	2.14	13.5	52.4	30.4	0.80	1.5	0.60	31	n.	18	4	8	4	0	0	November.
December...	27.6	33.2	29.4	29.9	50	.....	8	.....	2.40	17.5	79.7	27.5	2.99	17.9	1.12	57	e.	11	3	17	13	5	0	December.
Average...	47.3	57.7	50.9	51.9	94†	.....	0†	.....	2.68	12.6	52.6	38.0	20.02‡	60.5‡	2.26†	34	n.	208‡	58‡	99‡	83‡	11‡	20	Averge.

* From observed readings of dry thermometer. † Extremes. ‡ Total. § 3 days. ‖ 5 days. Small letters indicate the number of observations that are missing.

ing most of the remaining third it blows from the south or southwest. These latter winds are hot and disagreeable. Usually they are strong and fill the air with dust. They blow for several days at a time and are often followed by a shower on the Anti-Taurus Mountains. Then a cool wind springs up from the north and the air becomes wonderfully clear. The clearness of the atmosphere is one of the most characteristic features of the climate. At Harpoot the mean annual cloudiness amounts to only 34 per cent. Haze is very rare. Usually the blue of the sky extends in almost undiminished deepness clear to the horizon. The lines and wrinkles on the sides of the mountains 50 miles away seem as clear as those that are but a tenth as far.

The extreme range of temperature during the three years has been 94°, from 0° to 94°, and the average monthly range has been 43°. This, however, does not adequately represent the equability of the climate. Sudden changes are almost unknown. The average daily range of temperature is about 17°. Of greater significance is the fact that the average change from day to day is only 2.7°. Often, for ten days at a time, the mean daily temperature increases at the rate of 1° more or less per day, and then for three or four days falls as steadily, though more rapidly, at the rate of 3° or 4° per day. Storms rarely last more than one day. Weather prediction will be an easy matter here; indeed so regular and moderate are all changes that the people pay no attention to them, except at the time of the spring and autumn rains.

From the middle of April to the middle of October there is no frost, and often there is none from the 1st of April to the end of October. Plowing on the plain, 1,200 to 2,000 feet below Harpoot, begins in February, and the cotton harvest is not finished till well on in the month of November. The rainfall is sufficient in quantity for all sorts of agriculture, but owing to its uneven distribution through the year,

irrigation is everywhere necessary. It is carried on in the most primitive way, and no attempt is made to conserve the supply of water, either by making reservoirs or by planting trees on the mountains, which are everywhere deforested. Many, perhaps half, of the fields that are in use, have no water supply, and are planted on the chance that the rain may be abundant; consequently in dry years there is a great deal of distress.

WINTER FOG AT HARPOOT.

The one extreme feature of the climate of Harpoot is the winter fog, and in this it can compete with the world. A description of a fog which occurred in January, 1901, will show its nature. It must be remembered that Harpoot is built on the top of a mountain and overlooks a large plain, the valley of the south branch of the Euphrates, from 1,200 to 2,000 feet below.

Five days ago [i. e., January 29—Ed.] after a light snowstorm the wind shifted to the northwest, and toward evening we had a few hour of fine weather. The air was damp but perfectly clear, and two hours after sunset the mountains, 20 miles away, could be seen by the light of the new moon. But soon, as the air grew colder, fog began to form below us, and by 9 o'clock had enveloped Harpoot. Since then it has continued without a break. Everything is white and dreary. Twenty feet away objects look hazy, and, at the best, everything is swallowed in fog at a distance of 100 yards. At times nothing can be seen at half that distance. Sounds and voices come from all directions with a perplexing clearness. In riding or walking one feels as though he were close to the edge of a yawning abyss. In many places the streets are covered with a thin invisible coating of ice, and people fall frequently. No one stirs from home unless compelled to. In a fog to lose the path on these bleak mountains or treeless plains is fatal. The villagers do not dare to try to come to the city, and often customers are so few and the shops so cold that business even in the city is wholly suspended. The air is almost still, but what little wind there is chills one through and through. In the orchards every branch and twig is covered with a dainty furry coat of fine and very perfect snow crystals. As the days go by this grows thicker and little white spires shoot out here and there. On the lee side these increase in size and number until a twig a quarter of an inch thick becomes a white club 4 inches or more in diameter. When a disconsolate bird lights on a branch he causes a snowstorm below him. If a breeze springs up, the crystals soon lie on the ground as snow an inch deep. After five days of fog our whole world is white. One sees white houses, white fields, white trees, a white sky, white horses, white men. It is beautiful, and once seen is never to be forgotten.

Two or three days later there is a morning when the light comes early. The sky is blue overhead and all around the horizon there are bands of purple, pink, and red. The mountains stand out sharp and white for half their height, and soon a high one 30 miles west is tipped with delicate pink. The fog has gone from above, but the foot of the mountain and all the plain are still shrouded in mist. It is no longer dull, but bright and glorious. It is a genuine sea of fog with islands rising here and there. All around it joins the mountains in an even line. Its surface is agitated by great waves a hundred feet high and a third of a mile long. The sunlit side is pink and gold and the shady side is dull gray. Slowly they rise and fall, pouring into every little valley and flowing out again. One can almost see the breakers; white jets rise like spray with a slow and stately motion. All day the fog oscillates back and forth just below Harpoot. Sometimes the waves move slowly, a complete rise occupying half an hour. At other times the waves are smaller and take but half as long a time. A few people in mountain observatories may be familiar with this wonderful sight, but no other city in the world can boast of anything like it. The sad thing is that not one in a hundred of the inhabitants even realizes that it is beautiful.

This fog is confined to the great valley between the Taurus and Anti-Taurus ranges and usually occurs when both the plains and the mountains are covered with snow. The valley extends from Malatia to Mush. It is 75 miles wide and 200 miles long. The fog photographs taken at Mount Tamalpais and recently published in the MONTHLY WEATHER REVIEW show just such scenes as are frequently seen at Harpoot. The time during which the fog remains unchanged varies from one to ten or even twelve days.

During the winter of 1900–1901 an attempt was made to investigate the movement and formation of the fog. The winter was very open and less fog was experienced than usual. At five places beside Harpoot records were kept of the occurrence and height of the fog. From these the accompanying diagrams on Chart X have been constructed. The temperature curves represent the maximum, minimum, and mean as recorded at Mezereh by Rev. Père Marc, Capucin Missionaire Apostolique, who has kindly placed his observations at the writer's disposal, and at Harpoot by the writer. Officially registered maximum and minimum thermometers were used in both cases. Mezereh is 2½ miles southwest of Harpoot and is 1,250 feet lower. The barometric curve represents the readings of an aneroid as recorded at Harpoot. The shaded areas of the lower diagram show the date of the occurrence of fog and the elevation of the top and bottom of the fog on each successive day. Thus, on January 21, the first fog of the year was formed at the level of the Euphrates River, 2,500 feet. Next day the fog had increased so that all the plain from an elevation of 2,500 to 3,800 feet was covered. On this day Mezereh was in the fog, but Harpoot was not. On the 23d the fog was still higher, reaching a point but slightly below Harpoot. After that it slowly descended until the storm of the 27th and 28th. The marked inversion of temperature at the time when Harpoot was in the sunshine and Mezereh under the fog will be noticed. The maximum inversion occurred on the nights of January 25 and 26, when it amounted to 15° C. and 14.6° C. (27° F. and 26° F), respectively, which is equal to two and one-sixth degrees Fahrenheit per 100 feet of descent. Another remarkable instance of inversion occurred on the morning of December 11, 1900. The writer spent the night at the village of Ichmeh, on the edge of the plain, at an elevation of 3,000 feet. During the night fog formed on the lower part of the plain, the top being 100 feet below Ichmeh. At 7 a. m. the temperature was 46° F. and the air was perfectly clear overhead. An hour and a quarter later, at an elevation of 2,550 feet, in the lowest part of the plain and at a distance of only 2 miles from Ichmeh, the same thermometer showed a temperature of 32° F. when exposed in the fog. The inversion in this case amounted to 3.1° F. per 100 feet of descent.

On January 29, 1901, was formed the fog which has been described at some length above. In this case instead of an inversion of temperature between Harpoot and Mezereh we find a remarkably close agreement. Both places were included in the cooling which caused the fog. On February 5, however, when the fog descended below Harpoot the inversion at once became apparent. The last fog of the season began on February 15, and because of the warmth of the air was irregular in its motions. The inversion of temperature which gave rise to it was confined to the nights and hence is only evident in the minimum curves.

From the limited observations that have been made the fog seems to be divisible into two types. In the first a snowstorm is followed by two or three clear, cold days, with falling temperature. The low plains rapidly radiate their heat and become much colder than the mountains, and at last condensation begins. This takes place first over the Euphrates River where the absolute humidity is highest. It spreads first along the smaller streams and then over the plains. As the fog thus rises it appears to flow like water. Gradually its thickness increases until it reaches a maximum of more than 2,000 feet and covers an area of five or six thousand square miles. The upper surface of the fog rises and falls in fairly close agreement with the rise and fall of the barometer. When a cyclonic area of low pressure comes the fog is dispersed, sometimes with precipitation and sometimes without.

The second type is also formed after a snowstorm, but in this case the clear weather between the storm and the fog lasts but a few hours. While the relative humidity is yet high on account of the storm, night comes on and radiation into the clear air is rapid. This process is most active about

half way up the mountains and here condensation soon begins. The clouds or fog thus formed prevent further radiation from below. Hence, the dew-point is not reached at lower levels and the fog does not descend to the plain. This fog continues like the first type, but disappears as it came, by breaking up into clouds at about the elevation where it was formed. These clouds are gradually dissipated into the surrounding air. Between these two types there is every gradation.

THE RAINFALL OF THE EUPHRATES BASIN.

In connection with the rainfall of Harpoot, attention should be called to that of the Euphrates basin as a whole, including its two great branches, the Tigris and the Karun rivers, which join it to form the Shat-el-Arab. The figures given by the few authorities that it has been possible to consult are as follows:

Chambers's Encyclopedia: Area of basin of Shat-el-Arab, 108,000 square miles.

Alden's Encyclopedia: Area of basin of Shat-el Arab, 108,000 square miles.

Redway and Hinman; Natural Advanced Geography: Area of basin of Shat-el-Arab, 490,000 square miles.

Redway and Hinman: Total annual rainfall, 60 cubic miles.

Redway and Hinman: Average annual rainfall, 7.8 inches.

Guyot, as quoted in Johnson's Encyclopedia: Area of basin of Shat-el-Arab, 255,000 square miles.

Maury; Manual of Geography: Area of basin of Shat-el-Arab, 250,000 square miles.

The last two authorities seem to be nearly correct, although a careful estimate of the area as given on Kiepert's map gives a total of 305,000 square miles. This latter figure includes two areas which may have been left out in the other estimates. The first is the basin of Lake Van, which has an area of 8,500 square miles. The lake has no visible outlet. It lies between the upper waters of the Tigris and Euphrates rivers, and is steadily rising, so that in time it will probably overflow to one of them. The other area which may have been omitted is part of Arabia, which belongs to the basin, although its rainfall all evaporates before reaching the river.

Data as to the rainfall of the Euphrates basin are very scanty. Redway and Hinman give the average annual 7.8 inches. The following are all that it has been possible for me to obtain:

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.	Annual.
Harpoot	1.32	2.74	4.53	2.15	1.82	0.92	0.01	0.02	0.17	2.55	0.80	2.99	20.02
Aintab	3.56	3.48	2.91	2.48	1.38	0.21	0.08	0.02	0.02	0.82	3.32	4.55	22.71
Mosul	3.19	2.36	1.54	1.58	0.24	0.04	0.00	0.00	0.00	0.51	0.67	2.05	12.18
Baghdad	1.57	2.48	1.93	1.18	0.28	0.02	0.00	0.12	0.02	0.04	1.02	1.97	10.63
Marsovan	1.14	1.29	2.02	2.67	2.68	2.95	0.40	1.24	0.47	1.78	1.04	1.33	19.01
Bushire	3.39	2.52	0.87	0.59	0.02	0.00	0.00	0.00	0.00	0.12	2.16	3.70	13.37

Of these six places the last two are not included in the Euphrates basin, but as they are comparatively near they have been inserted for comparison. The higher eastern parts of the Taurus and Anti-Taurus ranges near Van and Mush have a decidedly heavier precipitation than the western part. The 305,000 square miles which drain to the Shat-el-Arab may be roughly divided into four sections, as follows:

I. Mesopotamia from east of the Persian frontier to the Arabian Desert. Area, 165,000 square miles. Average annual rainfall, 12 inches. Total quantity of water, 32 cubic miles. The mountainous eastern part of this region receives more than 12 inches and the western part toward the desert less.

II. The southern and eastern part of the Zagros Mountains and Mesopotamia from Jesireh to Diarbekir. Area, 60,000 square miles. Average rainfall, 16 inches. Total quantity, 15 cubic miles.

III. Central part of Zagros Mountains and western part of Taurus and Anti-Taurus Mountains, including Aintab, Diarbekir, Harpoot, etc. Area, 42,000 square miles. Average rainfall, 21 inches. Total quantity, 14 cubic miles.

IV. Taurus and Anti-Taurus Mountains northeast of a line from Egin to the mountains south of Bitlis. Area, 38,000 square miles. Average rainfall, 24 inches. Total quantity, 15 cubic miles.

Sum: Total area, 305,000 square miles. Average rainfall, 15.9 inches. Total quantity of water, 76 cubic miles.

This estimate may be modified in two respects. The lack of rain on the border of the Arabian Desert may reduce the average for Mesopotamia to less than 12 inches. The heavy precipitation on the mountainous district around Lake Van may increase the average for the fourth division. Until further data are procured the two may be regarded as offsetting each other.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. Maxwell Hall, the following data are offered to the MONTHLY WEATHER REVIEW in advance of the publication of the regular monthly weather report for Jamaica:

Jamaica, W. I., climatological data, June, 1901.

	Negril Point Lighthouse.	Morant Point Lighthouse.
Latitude (north)	18° 15′	17° 55′
Longitude (west)	78° 23′	76° 10′
Elevation (feet)	33	8
Mean barometer, 7 a. m.	29.913	29.918
Mean barometer, 3 p. m.	29.886	29.895
Mean temperature, 7 a. m	79.8	.....
Mean temperature, 3 p. m	81.6	.....
Mean of maxima	86.5	.....
Mean of minima	74.6	.....
Highest maximum	89.0	.....
Lowest minimum	70.0	.....
Mean dew-point, 7 a. m	73.5	.....
Mean dew-point, 3 p. m	74.9	.....
Mean relative humidity, 7 a. m.	81.0	.....
Mean relative humidity, 3 p. m.	80.0	.....
Total rainfall (inches)	9.51	13.00
Average wind direction, 7 a. m	ese.	e.
Average wind direction, 3 p. m	se.	e.
Average hourly velocity, miles, 7 a. m	9.3	9.0
Average hourly velocity, miles, 3 p. m	11.9	13.0
Average cloudiness (tenths):		
7 a. m. Lower clouds	1.5	3.1
7 a. m. Middle clouds	2.0	2.4
7 a. m. Upper clouds	3.6	1.2
3 p. m. Lower clouds	5.6	3.0
3 p. m. Middle clouds	3.1	2.3
3 p. m. Upper clouds	0.7	1.1

NOTE.—The pressures are reduced to standard temperature and gravity, to the Kew standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

Comparative table of rainfall for each geographical division.

Divisions.	Relative area.	Number of available stations.	Rainfall. Average for May.	Rainfall. Current for May, 1901.
Northeastern division	25	22	8.05	17.52
Northern and subcentral division	22	55	4.51	8.23
Western-central division	26	26	8.02	14.95
Southern division	27	31	4.70	15.39
General means	.....	.....	6.32	14.03

In taking the average rainfall Mr. Hall uses only those stations for which he has several years of observation, so that the column of averages represents fairly well the normal rainfall for each division, while the column for the current month represents the average rainfall at those same stations. The relative areas of the division is very nearly the same and is given in the following table as expressed in percentages of the total area of Jamaica. The number of rainfall stations utilized in each area varies slightly from month to month, according as returns have come in promptly or not, but will not differ greatly from the numbers in the second column of the table.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

TABLE 1.—*Hourly observations at the Observatory, San Jose de Costa Rica, during June, 1901.*

Hours.	Pressure.		Temperature.		Relative humidity.		Rainfall.		
	Observed, 1901.	Normal, 1889-1900.	Observed, 1901.	Normal, 1889-1900.	Observed, 1901.	Normal, 1889-1900.	Observed, 1901.	Normal, 1889-1900.	Duration, 1901.
	660+ *Mm.*	660+ *Mm.*	° *C.*	° *C.*	%	%	*Mm.*	*Mm.*	*Hrs.*
1 a. m.	4.05	3.58	17.70	17.73	94	93	0.3	2.2	0.59
2 a. m.	3.78	3.23	17.89	17.49	93	93	0.2	1.7	0.08
3 a. m.	3.42	2.99	17.58	17.25	94	93	0.1	1.4	0.08
4 a. m.	3.33	2.95	17.37	17.09	94	93	1.1	1.2	0.91
5 a. m.	3.37	3.10	17.20	17.01	93	93	2.2	1.1	1.50
6 a. m.	3.61	3.41	17.16	16.91	92	92	0.8	0.9	2.50
7 a. m.	3.92	3.72	18.63	18.59	88	87	0.2	0.4	1.50
8 a. m.	4.10	3.95	21.12	20.53	74	81	0.0	0.5	0.00
9 a. m.	4.23	4.11	22.71	22.40	67	73	0.0	0.9	0.00
10 a. m.	4.26	4.11	24.53	23.90	64	69	0.0	1.9	0.00
11 a. m.	4.11	3.91	25.56	24.77	62	67	0.0	2.0	0.00
12 m.	3.73	3.62	25.26	25.10	65	68	0.0	4.3	0.00
1 p. m.	3.38	3.21	24.88	24.81	69	70	7.3	10.1	1.16
2 p. m.	3.02	2.83	23.67	23.77	75	74	24.6	27.0	4.08
3 p. m.	2.83	2.57	22.43	22.45	79	79	41.6	28.8	7.34
4 p. m.	2.70	2.54	21.56	21.24	84	84	38.6	53.1	6.33
5 p. m.	2.87	2.83	20.55	20.38	89	87	48.1	41.1	9.11
6 p. m.	3.24	3.15	19.86	19.72	92	89	37.1	48.6	9.46
7 p. m.	3.71	3.57	19.44	19.22	94	91	24.2	24.7	10.25
8 p. m.	4.10	3.90	19.17	18.87	95	92	18.2	18.8	7.46
9 p. m.	4.41	4.10	18.91	18.63	94	92	19.9	10.2	5.57
10 p. m.	4.54	4.24	18.69	18.35	95	93	13.5	4.0	6.28
11 p. m.	4.58	4.23	18.40	18.13	95	93	3.1	3.4	4.41
Midnight	4.36	3.98	18.20	17.83	95	92	2.5	2.3	3.58
Mean	663.73	663.47	20.35	20.12	85	85	.....	.....	.....
Minimum	660.60	660.73	14.6	13.20	38	.....	.....	.....	.....
Maximum	665.70	666.12	29.5	29.50	100	.....	22.1	.....	.....
Total	.....	.....	.....	.....	.....	.....	283.6	260.6	82.19

REMARKS.—The barometer is 1,169 meters above sea level. Readings are corrected for gravity, temperature, and instrumental error. The dry and wet bulb thermometers are 1.5 meters above ground and corrected for instrumental errors. The hourly readings for pressure, wet and dry bulb thermometers, are obtained by means of Richard registering instruments, checked by direct observations every three hours from 7 a. m. to 10 p. m. The hourly rainfall is as given by Hottinger's self-register, checked once a day. The standard rain gage is 1.5 meters above ground. In the Costa Rican system the San Jose local time is used, which is $0^h\ 36^m\ 13.3^s$ slower than seventy-fifth meridian time.

TABLE 2.

Time.	Sunshine.		Cloudiness observed, 1901.	Temperature of the soil at depth of—				
	Observed, 1901.	Normal, 1889-1900.		0.15 *m.*	0.30 *m.*	0.60 *m.*	1.20 *m.*	3.00 *m.*
	Hours.	*Hours.*	%	° *C.*	° *C.*	° *C.*	° *C.*	° *C.*
7 a. m.	7.03	9.79	75	22.05	22.32	22.86	22.05	21.36
8 a. m.	17.92	17.35	.....	.....	.....	.....	.....	.....
9 a. m.	21.25	19.58	.....	.....	.....	.....	.....	.....
10 a. m.	22.32	19.30	68	22.34	22.39	22.88	22.12	.....
11 a. m.	22.12	17.75	.....	.....	.....	.....	.....	.....
12 m.	16.16	14.09	.....	.....	.....	.....	.....	.....
1 p. m.	10.58	11.58	83	22.87	22.60	22.89	22.11	.....
2 p. m.	8.00	10.52	.....	.....	.....	.....	.....	.....
3 p. m.	4.59	7.01	.....	.....	.....	.....	.....	.....
4 p. m.	1.33	4.36	96	22.85	22.59	22.86	22.04	.....
5 p. m.	0.33	1.67	.....	.....	.....	.....	.....	.....
6 p. m.	0.00	0.37	.....	.....	.....	.....	.....	.....
7 p. m.	.....	.....	97	22.76	22.58	22.85	22.03	.....
8 p. m.	.....	.....	.....	.....	.....	.....	.....	.....
9 p. m.	.....	.....	.....	.....	.....	.....	.....	.....
10 p. m.	.....	.....	80	22.61	22.58	22.87	22.04	.....
11 p. m.	.....	.....	.....	.....	.....	.....	.....	.....
Midnight	.....	.....	.....	.....	.....	.....	.....	.....
Mean	.....	.....	84	22.50	22.51	22.88	22.07	21.36
Total	131.63	133.26	.....	.....	.....	.....	.....	.....

Notes on the weather.—On the Pacific slope and at San Jose the general weather was about normal for the season. On the Atlantic side it was very dry on the coastal belt and rather wet in the upper region.

Notes on the earthquakes at San Jose.—During June none were felt.

TABLE 3.—*Rainfall at stations in Costa Rica, June, 1901.*

Stations.	Amount.	No. rainy days.	Stations.	Amount.	No. rainy days.
	Mm.			*Mm.*	
1. Sipurio	255	21	13. Turrialba	266	21
2. Boca Banano	51	13	14. Juan Vinas	276	25
3. Limon	33	7	15. Santiago	227	17
4. Swamp Mouth	24	6	16. Las Concavas	.....	.....
5. Zent	50	20	17. Cartago	.....	.....
6. Gute Hoffnung	98	12	18. Tres Rios	548	23
7. Siquirres	294	17	19. S. Francisco G	301	23
8. Guapiles	270	19	20. San Jose	284	23
9. San Carlos	433	23	21. La Verbena	341	24
10. Sarapiqui	422	28	22. Alajuela	240	14
11. Las Lomas	282	11	23. San Isidro Alajuela	383	28
12. Peralta	236	18	24. Nuestro Amo	309	25

REFORESTATION AND RAINFALL IN THE LEEWARD ISLANDS.

By W. H. ALEXANDER, Observer, Weather Bureau, dated May 28, 1901.

The forestry question has of late years assumed a place of unusual prominence in the Leeward Islands colony, owing to the alarming extent to which the destruction of native forests has been carried.[1] The chief industry, the production of sugar, being paralyzed and poverty being on the increase, the present population has been driven to other means of supplementing scanty wages, and one of these means is the burning of charcoal. Of course, to make the charcoal wood must be had and to get the wood trees must be felled. Hitherto this destruction of trees has been done in a most indiscriminate, not to say wanton, manner. So much so, in fact, that official notice began to be taken of the matter and we find the commissioner for the island of Tortola, in his report for 1899, referring to this matter in the following words, viz:

Charcoal burning constitutes a very important source of income to the people of this island, and is extensively carried on, with a deplorable effect on the soil and agriculture, and laying bare on the hills a naturally shallow soil to the action of rain and wind, and lessening the effect of the rainfall to a marked degree.

In August, 1899, the traveling superintendent of the imperial department of agriculture deals with this subject relative to the Virgin Islands in the following language, viz:

The destruction of forest trees, particularly those growing on the upper ridges, is a very serious matter and deserves careful attention. Indeed it is not too much to say that on the protection of the remaining forest lands the future agricultural development of the island largely depends. Each year witnesses the destruction of fresh areas of forest for the purpose of charcoal burning, and as the lower slopes become cleared, the charcoal burner finds it necessary to extend his work of destruction to the upper ridges. About the center of the island there is a large area of several hundred acres at an elevation of 1,000 feet, from which the forest has entirely disappeared. This district is now a bleak and wind-swept waste, from which the upper layers of soil have been removed by the action of the wind and rain. There is abundant evidence that Tortola once possessed numerous streams of running water. There are few now. * * * There can be little doubt that the continuation of such a system of forest destruction will in time have a very serious effect on the climatic conditions of the island.

These and other representations relative to the subject were laid before the Secretary of State for the Colonies, London, and on October 3, 1899, he addressed a letter to the governor of the Leeward Islands, urging upon him the the impor-

[1] See the following documents filed in the Library of the Weather Bureau as Nos. 22364, 22365, and 22366:

Correspondence relating to the preservation of forests and reforestation in the Leeward Islands. Printed by the Imperial Department of Agriculture for the West Indies. For official use only. By V. Gale, printer to the government of Barbados. 1900.

Report of a Select Committee of the Legislative Council on forest preservation in St. Kitts and Nevis (appointed May 17, 1900).

Circular letter from Charles T. Cox, administrator, dated Government House, St. Kitts, 9th of March, 1901, communicating an ordinance to establish a forestry board.

tance of taking immediate action looking to the preservation of existing forests and the reforestation of such areas as might be deemed advisable. The Secretary in his letter outlines the work in about this way, viz:

1. The determination of the altitude above which the forests should be preserved; suggesting also that this altitude must vary in the different islands.
2. The question of reservation: that is the right of entry on the part of the government to private lands to see that the law is being observed and to settle all questions of compensation, etc.
3. The machinery for enforcing the law when passed.

Acting upon this letter, the governor opened up corresondence with Dr. Morris, Imperial Commissioner of Agriculture for the West Indies, and with the various administrators, asking for suggestions as to the best means of accomplishing the desired ends. I do not know the final results of this correspondence as indicated in the local measures adopted in the various islands, but I am credibly informed that action in the matter is at about as advanced a stage in this presidency (St. Kitts–Nevis) as in any island of the colony. The authorities here took the matter in hand with commendable zeal and were among the first to arrive at something definite. Among the first and most enthusiastic advocates of the subject was Mr. L. M. Kortright, Superintendent of Public Works, who early in 1900 prepared and submitted to the administrator for consideration a draft ordinance. In his letter of transmittal, Mr. Kortright makes this statement of the work in hand, viz:

The highest observed point at which canes are planted is 1,000 feet above sea level. I believe this to be the extreme limit at which canes can be grown at a profit. In fact, I have been informed on good authority that above 800 feet canes cease to be profitable, for agricultural and climatic reasons.

GENERAL SCHEME.

(1) The present elevation on each estate of cane plantation to be considered as the limit at which canes can be grown at a profit.
(2) A belt of forest trees above the canes for about 100 feet vertical.
(3) Above this line, a belt, of say, 200 feet vertical, to be reserved for pasture and ground provisions.
(4) Above this line the forest to be replanted when necessary and preserved.
(5) All steep hill sides in the lower levels to be planted in forest and preserved. This refers to such places as Monkey Hill, Brimstone Hill, Ottley's Level, Blakes Mountain, etc.
(6) All ravine sides to be reclothed and preserved.
(7) All lands to be under the charge of a forestry board for the above purposes.
(8) Estates to be liable for carrying out the work and to be paid so much an acre for a term of years.
(9) Land tax to be remitted on forest lands.
(10) An export duty of so much per ton to be levied to pay estates for carrying out the work and to create a fund for the future maintenance of forests.

With a view to the application of these general principles to the individual requirements of each estate I have ventured to frame a draft ordinance, which I forward herewith. I must disclaim any legal knowledge and have merely adopted this plan as being the readiest way of explaining my views.

It is not necessary for the purposes of this paper to give the ordinance in full. It sets out by making provision for a forestry board, and then defines the powers of said board, as follows, viz:

4. Subject to the provisions of this ordinance the forestry board shall have and exercise full and exclusive control over the estate, or plantation, or property declared by the legislative council to be subject to the provisions of this ordinance for the following purposes:
(*a*) For the establishment of a belt of forest extending from the highest points of the existing cane cultivation to such elevation and following such a contour as the configuration of the land or other local causes renders necessary or desirable.
(*b*) The establishment of a belt of pasture or provision land above the last-mentioned elevation, and extending upward to such elevation and following such a contour as the configuration of the land causes or renders possible or desirable.
(*c*) The establishment of forest above the last-mentioned elevation as high as the estate, plantation, or property extends.
(*d*) The establishment of forest on the banks and sides of all ravines.
(*e*) The establishment of forest on the sides or slopes of all hills and steep declivities within the limits of the estate, plantation, or property.
(*f*) In respect of all the above-mentioned subsections the full and exclusive power to plant or cause or permit to be planted such trees or other vegetation as may appear from time to time best suited for the particular locality and to replant or cause or permit to be replanted such trees or other vegetation; and to lop and prune the same or cause or permit to be lopped and pruned; and to drain, embank, and support the land, or cause or permit the said land to be drained, embanked, and supported; and to give control and direct the character of the cultivation; and to do or cause to be done such other things as may be necessary to give effect to the meaning and intention of this ordinance.
(*g*) The issuing and cancellation of licenses to cut timber and to burn charcoal.

Provided always, that nothing in the foregoing shall be construed as infringing any of the rights or privileges of owners of estates, plantations, or properties in fee simple; or restricting such owners in the free use of such timbers as may be required for their proper and legitimate use, or of the fruit or produce of such timbers. so long as such timbers, fruit, or produce are cut and removed under direction of the board.

Then follow articles of procedure and other details of execution of which it is unnecessary to speak in this connection. Suffice it to say, that this draft was duly submitted by the administrator to the legislative council of St. Kitts–Nevis, and a select committee was appointed to consider the matter and report thereon. From the report of this committee I make the following extracts, viz:

2. In addition to independent inquiries from persons whose long residence and means of observation lend weight to their opinions we have had before us a report and draft bill prepared by the superintendent of public works, together with a report thereon by the imperial commissioner of agriculture for the West Indies.
3. As our investigations have led us to indorse the views expressed in these documents in most respects we have deemed it convenient to accept them as a basis for our report, making such additions and alterations as suggested themselves in the course of inquiry.
4. The subject presents three aspects for consideration, viz:
(*a*) Influence of forest on rainfall.
(*b*) Influence of forest as affecting atmospheric humidity.
(*c*) Influence of forest in modifying floods and minimizing their destructive action on the arable lands.

We have been able to obtain records of rainfall, extending back for forty-four years, in Basseterre, and also for a less period of time in other districts. An examination of the plotted curves does not lead to the belief that the average rainfall has diminished within recent years. Nor, indeed, does the physical character of St. Kitts lend itself to such a supposition. The island consists of a central ridge of high mountains facing the northeast, the direction of the prevailing winds. The saturated winds from the Atlantic, meeting the mountain ridge, are forced upward until they are condensed in the colder altitudes and fall as rain down the mountain slopes.

6. With regard to the action of forest in affording humidity in its vicinity this is undoubtedly true, and in some localities the destruction of the forest vegetation has had a marked effect. As an illustration the case of Frigate Bay estate may be cited. This is a stock estate, lying at a low level, bounded on one side by the sea and on the other by a low ridge of hills, which were formerly in thick forest. In former years the humidity of the air afforded sufficient moisture to maintain the pasturage in good condition. Now, however, every stick of timber has been felled for burning into charcoal, with the result that the climatic conditions of the estate have been entirely altered. The remedy for this lies in reclothing in forest all the ravines which, like the ribs of a fan, radiate from the central ridge to the sea; and, as regards the low-lying districts, replanting in forest the various ridges, prominences, and steep declivities which are at present in low scrub or ground provisions.

7. With regard to the disastrous effect of the denudation of the mountain slopes in causing destructive floods we need hardly occupy the time of the council to any great extent by dwelling on the causes which have led to the deforesting of the high mountain lands. Briefly stated they are due to the clearings by small renters for growing ground provisions. As the forest recedes his patch of land becomes unproductive from increased aridity and from exposure to storm waters. He then clears another patch of forest at a higher level with a like result in the course of time. And so the process continues. Another cause is the wanton and indiscriminate destruction of mountain timber for charcoal burning. An instance of this destruction is quoted by Doctor Morris on the authority of Mr. Joseph Briggs of Nevis, in paragraph 10 of his report of the 20th of April, 1900. The result of this wholesale destruction of forest vegetation is the increased violence of storm waters, which everywhere rush through valuable cane lands, carrying destruction and loss not only to the estates themselves, but to the different towns and villages situated at lower levels.

8. To sum up the result of our inquiry we are of opinion—
1st. That immediate steps should be taken to protect all remaining forest areas.

2d. That charcoal burning should only be permitted under proper control and subject to regulation.

3d. That a considerable portion of the lands at high elevations and now in ground provisions or abandoned, together with all ravine sides, ridges, and prominences in the lower levels, should gradually be reclothed as funds become available.

Perhaps the most important change recommended by the committee in the scheme as presented by Mr. Kortright is that the belt of pasture land lie immediately above the cane lands instead of being separated therefrom by a belt of forest. This change being made together with a few other immaterial alterations, the draft as presented by its auther will go to the council for its approval in a short time. If I am correctly informed in the matter it will be passed by the council without delay, and the work of execution begun at once.

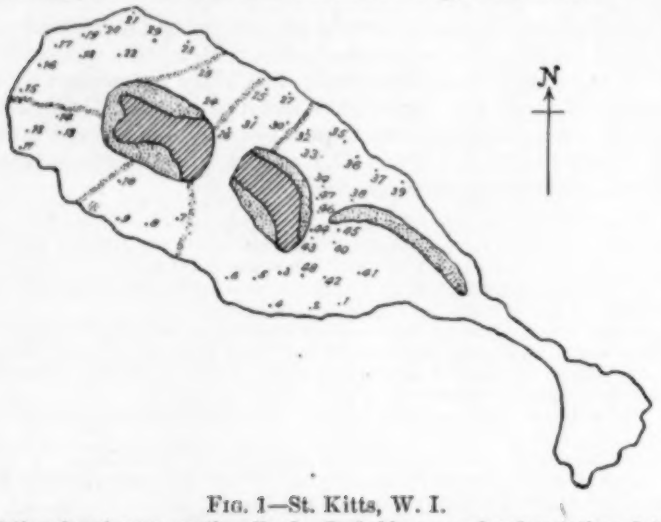


FIG. 1—St. Kitts, W. I.

Existing forest area, section lined. Probable area of reforestation, dotted. There are many minor areas which would probably be placed in forest, not shown.

Reference table.

Number on map.	Name of rainfall station.	Height above sea.	Number on map.	Name of rainfall station.	Height above sea.
		Feet.			*Feet.*
1	Buckley	140	25	Mills	100
2	Camp	80	26	Phillips	550
3	Ben Lomond	600	27	Bouryeaux	100
4	West Farm	120	28	Estridge	350*
5	Ottley P. P		29	Lavington	
6	Stone Fort	270	30	Lodge	300
7	Wingfield	200	31	Molyneux	360
8	Lamberts	170	32	Brighton	375
9	Con Phipps	100	33	Spooner	290
10	Vambelle	500	34	Whites	650
11	Leper Asylum	50	35	Hermitage	
12	Bourkes	120	36	Cunningham	
13	Burts	400	37	Canada Lower	130
14	Farm	220	38	Canada Upper	520*
15	La Vallee	100	39	Conaree	
16	Cranstouns	300*	40	Needsmust	50
17	Brothersons	90*	41	Pond	10*
18	Belmont		42	Shadwell	150*
19	Willets	50*	43	Milliken	800
20	White Gate	70*	44	Fountain	850*
21	Caines	25	45	Stapleton	
22	Profit	400	46	Bayfords	
23	Bellevue		47	Green Hill	
24	Mansion	320	48	Olivees	460

*Estimated.

So much, then, for the formative stage of the question. In order to arrive at something of an idea as to just what is hoped to be accomplished I have asked Mr. Kortright to prepare for me a map of St. Kitts showing the location of existing forests and the lands that it is proposed to reforest. The accompanying map, fig. 1, is the answer to my request. This map should be studied in connection with the one on page 487, MONTHLY WEATHER REVIEW for November, 1900, and it will then be observed that the forest areas as they now exist are simply the mountain tops and that it is proposed to reforest the mountain slopes and the banks of the streams. The figures on the map and the reference table are valuable only as locating stations from which rainfall data have been collected, and may be helpful in studying the climatology of St. Kitts. The elevations marked "estimated" were put in by me and were obtained from the persons rendering the rainfall reports. All other entries are by Mr. Kortright.

There are many and substantial reasons for the planting of trees, so many in fact, that it is quite unnecessary to drag in fallacious arguments because expectations based upon conclusions drawn from false premises are almost certain to bring disappointment, resulting in a hasty and unreserved condemnation, in toto, of a really meritorious measure. The results that may be reasonably expected must be known before it can be determined whether or not the expense is justified. Of course in this particular case the matter has passed beyond the argumentative stage but no harm can possibly come from the statement of a few facts—the teachings of meteorology are abundantly substantiated by experimentation.

It is quite evident from the correspondence relative to the subject of reforestation that in many minds there still lingers a vague idea that the rainfall is actually increased or decreased by the existence or nonexistence of forests. This idea finds neither encouragement nor support in the extensive experiments made, notably in India, on this very point. Professor Abbe, writing on this line, says:

As regards the effect of forests and deforestation on rainfall, you may safely assert that it is absolutely inappreciable; but the effect of the protection from wind on the catch at the gage is very considerable. Thus, in India, in a certain barren region, the gages caught little rain. As the forest grew up the gages caught more rain, while the gages just outside the forest region caught just the same as ever, and gages raised on high supports above the trees caught as little as before, showing that there had been no change in the rainfall, but merely a change in the error introduced by the action of the wind on the falling drops at the mouth of the gage.

Of course, all the waste land in the island not used for sugar or food crops should be devoted to the best forest growth, not only for the crop but for the protection against storm winds and for aesthetic purposes. The accumulation of rich soil beneath forests and the retention of water in shaded forest soil is so important that forest growth should be encouraged by rewards and barren wastes be discouraged by taxation.

The conclusion of the whole matter, then, seems to be that trees are valuable as conservators of moisture, as a protection against winds and floods, as timber, and for aesthetical purposes; but there is absolutely no good reason for hoping to increase the rainfall by planting trees.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana, Director of the Central Meteorologic-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletin Mensual. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means are now reduced to standard gravity.

Mexican data for June, 1901.

Stations.	Altitude.	Mean barometer.*	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Culiacan (Sin.)	112	29.60	103.5	69.1	85 5	55		s.	ne,
Durango (Seminario)	6,243	23.93	98.6	48.2	75.0	25	0.05	ne.	e.
Leon (Guanajuato)	5,906	24.21	93.0	55.6	75.6	34	1.26	ese.	sw.
Linares (Nuevo Leon)	1,188	28.55	98.8	64.4	83.5	69	8.62	s.	s.
Mazatlan	25	29.80	86.2	69.3	79.2	77	T.	nw.	se,
Mexico (Obs. Cent.)	7,472	22.98	86.2	51.8	66.0	54	1.52	n.	
Morelia (Seminario)	6,401	23.88	87.8	53.8	69.8	59	2.31	sw.	e,
Puebla (Col. Cat.)	7,125	23.31	84.7	53.6	69.6	54	4.59	e.	ssw.
Saltillo (Col. S. Juan)	5,399	24.71	91.4	57.2	74.5	63	0.67	nw.	s.
S. Isidro (Hac. de Gto)			86.0	71.6			1.38		
San Luis Potosi	6,202	24.05	93.2	59.0	73.4	50	0.11	e.	e.
Toluca	8,812	21.91	84.0	39.2	61.7	54	3.34	w.	e.
Zapotlan (Seminario)	1,548	25.00	95.0	55.2	73.9	52	1.91	sse,	w.

*Reduced to standard temperature and gravity.

HAWAIIAN CLIMATOLOGICAL DATA FOR JUNE, 1901.

By CURTIS J. LYONS, Territorial Meteorologist.

Rainfall data for the Hawaiian Service.

Stations.	June, 1901.	Stations.	June, 1901.
HAWAII.		MAUI—*Continued.*	
HILO, e. and ne.	*Inches.*	Nahiku, ne	*Inches.* 5.00
Waiakea	3.45	Haiku, n	2.28
Hilo (town)	2.30	Kula (Erehwon), n	
Kaumana	3.76	Puuomalei, n	1.35
Pepeekeo	2.85	Paia, n	
Hakalau	2.99	Haleakala Ranch, n	
Honohina	2.78	LANAI.	
Laupahoehoe		Keomuku, e	0.00
Ookala	0.57	OAHU.	
HAMAKUA, ne		Punahou (Weather Bureau), sw.	1.42
Kukaiau	0.53	Kulaokahua, sw	0.98
Paauilo	0.25	Kewalo (King street), sw	1.34
Paauhau (Moore, Gibb)	0.10	United States Naval Station, sw.	0.72
Paauhau (Greig)		Kapiolani Park, sw	
Honokaa (Muir)	0.41	Makiki Reservoir	1.49
Honokaa (Rickard)		Manoa (Woodlawn Dairy), c	3.41
Kukuihaele	0.66	School Street (Bishop), sw	1.79
KOHALA, n.		Insane Asylum, sw	1.57
Awini Ranch		Nuuanu (W. W. Hall), sw	1.74
Niulii	0.65	Nuuanu (Wyllie Street), sw	
Kohala (Mission)	1.03	Nuuanu (Elec. Station), sw	4.81
Kohala (Sugar Co.)	1.04	Nuuanu (Luakaha) c	8.59
Waimea	0.51	Waimanalo, ne	1.57
Hawi	1.15	Maunawili, ne	2.59
KONA, w.		Kaneohe, ne	2.48
Kailua	8.49	Ahuimanu, ne	4.95
Kealakekua	6.10	Kahuku, n	1.40
KAU, se.		Waialua, n	0.82
Naalehu	1.21	Ewa Plantation, s	0.29
Honuapo	0.49	Waipahu, s	0.42
Hilea	0.30	Pacific Heights, sw	3.57
Pahala	1.01	Wahiawa, c	2.97
Moaula	1.79	Moanalua, sw	0.95
PUNA, e.		Kalihi-uka	4.19
Volcano House	1.70	KAUAI.	
Kapoho	3.59	Lihue (Grove Farm), e	3.19
Kalapana, se		Lihue (Molokoa), e	2.45
MAUI.		Lihue (Kukaua), e	6.03
Olowalu		Kealia, e	2.15
Waiopae Ranch, s		Kilauea, ne	4.23
Kaupo (Mokulau), s	5.12	Hanalei, n	4.85
Kipahulu, s	4.09	Waiawa, sw	0.45
Hamoa Plantation, se	2.81	Eleele, s	4.20
Nahiku, ne	6.23	Waiawa, Mountain, s	15.65

Records not hitherto published, May, 1901.

Kailua	6 81	Moaula	8.18
Kaumana	5.21	Kohala Sugar Co.	0.19
Awini Ranch	0.02	Hawi	0.92
Nuuanu (W. W. Hall)	2.95	Makiki Reservoir	4.43
Electric Light Station	5.51	Kalihi-uka	4.33

NOTE.—The letters n. nw. e. sw. se. ne. and s. attached to each name indicate the exposure or direction toward which localities face the sea; "c," central locality.

GENERAL SUMMARY FOR JUNE, 1901.

Approximated percentages of district rainfall as compared with normal: Hilo, 35 per cent; Hamakua, 10; Kohala, 22; Waimea, 27; Kona, 130; Kau, 150; Puna, 80; Maui, uncertain on account of frequent changes in stations, probably 125 on southeast exposures, and 80 on north exposures; Oahu, 100 per cent; Kauai, 100, excepting Hanalei, 75. Northerly exposures suffered, as in May, the sugar crop on the northern portion of the island of Hawaii being particularly affected. At Waimea, Hawaii, the main stream is lower than ever known before, owing to the denudation of Kohala mountain forest destroying the natural reservoirs.

The artesian well level on the 15th of June stood at 32.85 feet above the mean sea level. This is as low as the lowest on record.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 78.6; average minimum, 68.9; Waimea, Hawaii, 2,730 elevation, 77.2 and 65.2; Kohala, 521 elevation, 81.4 and 70.6; Ewa Mill, Oahu, 50 elevation, 86.7 and 69.1; Kulaokahua (W. R. Castle's), 60 feet elevation, highest, 87; lowest, 67; mean, 77.4. The average fall in temperature is 1° F., for each 300 feet of ascent.

The absolute humidity was the highest on record for June, showing the unusual southerly origin of the atmospheric supply.

Earthquake reported from Kona and Kau on the 8th; not from Hilo. Snow is still visible on summit of Mauna Kea. Kilauea exhibits heat symptoms. Heavy swell 4th and 24th; very smooth sea 6th to 15th. No thunder or lightning.

Meteorological Observations at Honolulu, June, 1901.

The station is at 21° 18′ N., 157° 50′ W.

Hawaiian standard time is 10h 30m slow of Greenwich time. Honolulu local mean time is 10h 31m slow of Greenwich.

Pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 2:30 a. m. Honolulu time.									
				Temperature.		Moisture.		Wind.		Average cloudiness.	Sea-level pressures.		Total rainfall at 9 a. m., local time.
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	29.95	75	68.5	83	68	67.5	78	se.	1-0	3	30.00	29.93	0.00
2	29.98	75	68.5	83	70	66.5	71	ne.	1	5	30.05	29.96	0.06
3	29.99	76	67.5	83	72	65.5	67	ne.	3	4-2	30.03	29.99	0.00
4	[29.98]	76	67.5	83	73	64.8	63	ne.	4	3	30.03	29.97	0.00
5	29.92	71	67	83	72	63.7	64	ne.	3	2	30.02	29.92	0.00
6	29.92	71	69	83	67	66.0	70	ne.	3	1-4	29.96	29.89	0.00
7	29.94	73	71.7	83	68	69.0	83	se.	1	5	29.99	29.93	0.04
8	29.96	69	68.3	82	72	70.7	83	s-e-n.	1-0	5-10	30.02	29.95	0.09
9	29.89	76	61	82	68	70.7	84	s-n.	1-0	5-10	29.99	29.91	0.00
10	29.88	72	71.3	84	70	70.3	76	s.	1-0	8	29.94	29.87	0.10
11	29.86	73	71.7	83	71	71.0	83	s-n.	1-0	5-1	29.92	29.85	0.01
12	29.92	75	73	83	72	71.3	80	s.	2-0	7	29.97	29.89	0.01
13	29.96	69	67	83	73	71.0	82	s-n.	1-0	6-2	30.02	29.91	0.00
14	30.01	74	68	84	69	68.3	76	s-nne.	1-2	4	30.07	29.92	0.00
15	30.00	75	68	86	70	66.3	66	ne.	3-1	2	30.04	29.99	0.00
16	30.01	76	68.5	85	74	66.7	67	ne.	3-1	2	30.04	29.96	0.04
17	30.05	77	69	84	73	65.5	64	ne.	3-4	4-1	30.07	30.00	0.01
18	30.06	77	68.5	84	75	65.7	65	ne.	3	4	30.11	30.04	0.00
19	30.01	76	70	84	74	65.7	64	ne.	3-5	3	30.09	30.01	0.04
20	29.94	76	69	84	75	67.5	73	ne.	4	6-3	30.02	29.96	0.08
21	29.93	76	71.5	82	74	67.3	72	ne.	4	6	29.96	29.91	0.15
22	30.01	77	71	84	74	68.5	71	ne.	4	3	30.04	29.93	0.00
23	30.06	74	69	85	76	67.7	68	ne.	4-5	4	30.09	30.01	0.41
24	30.00	76	69	83	72	66.3	69	ne.	3	7-3	30.09	30.01	0.04
25	29.95	75	68	84	73	66.7	71	ne.	3	5-2	30.04	29.95	0.08
26	29.95	74	68	85	72	65.3	66	ne.	3	2	30.00	29.92	0.00
27	29.97	73	70	84	69	66.7	71	ne.	2-3	3-8	30.01	29.94	0.12
28	29.98	77	68.5	84	70	68.3	72	ene.	3	6	30.04	29.96	0.02
29	29.92	75	68.5	85	75	66.3	68	ne.	4-2	6-3	29.99	29.91	0.08
30	29.89	76	69	84	70	66.3	69	ne.	4	3	29.94	29.86	0.04
Sums..													1.42
Means.	29.963	74.5	68.8	83.7	71.9	67.4	71.5		2.4	4.2	30.019	29.941	
Departure..	—.036	+2.0				+2.1	+1.0			+0.2			—0.10

Mean temperature for June, 1901 (6 + 2 + 9) ÷ 3 = 77.4; normal is 75.9. Mean pressure for June, 1901 (9 + 3) ÷ 2 = 29.976; normal is 30.012.

*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4:31 p. m., Greenwich time. ‡These values are the means of (6 + 9 + 2 + 9) ÷ 4. §Beaufort scale.

CLIMATOLOGY OF ST. KITTS. COMPARISON OF BAROMETERS.

By W. H. ALEXANDER, Weather Bureau.

In order to determine as far as possible the real or comparative value of the barometric means given in articles on the Climatology of St. Kitts, and published in the MONTHLY WEATHER REVIEW, Annual Summary for 1899, and in the MONTHLY WEATHER REVIEW for August, 1900, the barometers used in obtaining the original records were secured and exposed in the local office of the United States Weather Bureau beside the station barometer, the cisterns of all three being practically on a level—about 29 feet above sea level. On March 1 a series of readings was commenced and continued through the entire month, each barometer being read seven times per day: at 8 a. m., 9 a. m., 10 a. m., 12 noon, 2 p. m.,

3 p. m., and 4 p. m., local time. These hours were selected for the readings to bring the series into harmony with the old records. The readings of the station barometer were corrected for temperature, instrumental error, and elevation; the readings of the other two were corrected for elevation only by adding .030 inch. The results are given in the accompanying table.[1] For a description of the two old barometers the reader is referred to the article cited above in the August REVIEW.

The means of the 217 readings made during the month are as follows, viz:

	Inches.
United States Weather Bureau No. 274	30.014
Hancock-Plageman barometer	29.998
Evelyn barometer	29.954

From this it appears that the Evelyn barometer is .060 inches too low, and the Hancock-Plageman barometer .016 inches too low. This difference, however, may be largely due to deterioration of the old instruments, especially in the case of the Evelyn barometer which has now been in use over half a century.

Then again we may compare the means of this series with the corresponding March means given in Table I of the article in the August REVIEW, bearing in mind, however, that the Evelyn observations were not corrected for elevation, while the others were. It will be observed that the means in the accompanying table are invariably lower than Mr. Evelyn's means, the average difference being .032 inch, which would be greater, perhaps .062 inch, if we make allowance for the correction for elevation. In the case of the Hancock record the difference is very slight, only .007 inch on the average. His 9 a. m. mean is .018 inch lower than mine, our 10 a. m. means are exactly the same, while my 3 p. m. mean is .004 inch lower than his.

It would appear, therefore, from these figures that the records compiled by Messrs. Evelyn, Hancock, and Plageman are quite trustworthy in view of the circumstances under which they were made.

The above remarks by Mr. Alexander, in connection with the data in Table 1, p. 331, MONTHLY WEATHER REVIEW for August, 1900, indicate very clearly a deterioration in the Evelyn barometer at some time subsequent to 1868. The exact time and also the nature of the deterioration can not be determined from the data at hand, but the original records should give us some information on these points.

The following are the averages of Mr. Alexander's readings:

Time.	Mean observed pressure.			W. B.—Hancock.	W. B.—Evelyn.
	Evelyn.	Hancock.	W. B. 274.		
8 a. m.	29.938	30.005	30.035	+.030	+.097
9 a. m.	29.966	30.025	30.048	+.023	+.082
10 a. m.	29.980	30.034	30.054	+.020	+.074
12 noon	29.977	30.015	30.031	+.018	+.054
2 p. m.	29.952	29.980	29.990	+.010	+.038
3 p. m.	29.935	29.966	29.975	+.009	+.040
4 p. m.	29.927	29.960	29.972	+.012	+.045

We note at once that both the Evelyn and Hancock barometers, as compared with the Weather Bureau barometer, stood higher during the p. m. than during the a. m. This is what we would expect when we remember that only the Weather Bureau barometer has been corrected for temperature, and the attached thermometers averaged about 5° higher during the p. m. than at 8 a. m.

In the Smithsonian Meteorological and Physical Tables, 1859, is a table of corrections for temperature, to be applied to barometers with glass or wooden scales, from which it is found that a rise of 5° in the temperature should cause a corresponding rise of 0.014 in the mercury in the barometer. As will be seen, the rise in the case of the Hancock barometer is somewhat greater than this, and corresponds to a temperature increase of about 7°.

We must, therefore, conclude that the instrumental correction to the Hancock barometer of + 0.016 inch, as determined by Mr. Alexander, is subject to modification on account of temperature effect. When the temperature is low this correction should be increased, and when the temperature is high it should be decreased. This applies to all past records. Apparently at a temperature of about 85° the Hancock and Weather Bureau barometers should read alike after the latter has been corrected for temperature. It might be possible to determine from the series of readings taken in March a more accurate table of corrections for temperature for the Hancock barometer than the one given in the Smithsonian tables; but this has not been attempted.

The Evelyn barometer readings are so discordant among themselves and with the Weather Bureau barometer readings that it is hardly worth while to discuss them. We can only say that there is a large and unknown error in most of the readings since 1868.—*H. H. K.*

[1] Not printed in detail.—ED.

MONTHLY STATEMENT OF AVERAGE WEATHER CONDITIONS FOR JUNE.

By Prof. E. B. GARRIOTT, U. S. Weather Bureau.

The following statements are based on average weather conditions for June, as determined by long series of observations. As the weather for any given June does not conform strictly to the average conditions, the statements can not be considered as forecasts.

On the North Atlantic Ocean June is a comparatively quiet month. Along the transatlantic steamer tracks the prevailing winds are from the southwest and severe storms are infrequent. From the Banks of Newfoundland to the American coast fog occurs with winds from the southeast quadrant, and the conditions which favor fog development obtain over some part of this region during fully one-half the days of the month. Icebergs are likely to be encountered over or near the Grand Banks as far south as latitude 40° or 41°.

In the West Indies the hurricane season does not begin until August; the wet season, however, continues from May to October. The typhoon season in the Philippine Islands begins in May.

In the Pacific coast States of the United States the dry season practically begins in June, although July and August are the driest months of the year. In the Plateau region the monthly rainfall approaches the July and August minimum. In Arizona and New Mexico June is a dry month, but it is followed by the two wettest months of the year. In Montana and generally east of the Rocky Mountains the heaviest monthly rainfall of the year usually occurs in June.

Frost is unusual in the United States in June, and when it does occur it is confined to mountain districts and to the northern tier of States.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear

to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Nederlandsch Tijdschrift voor Meteorologie. Groningen. Eerste Jaargang.

Sieberg, A. De Meteorologie in hare beteeknis voor het praktische leven. Pp. 177–179.

Comptes Rendus. Paris. Tome 132.

Ponsot, —. Actions chimiques dans les systèmes dissous ou gazeux. Tension de vapeur. Hypothèse d'Avogadro. Pp. 1551–1553.

Journale de Physique. Paris. Tome 10.

Lefevre, J. Recherches sur la conductibilité de la peau de l'organisme vivant et sur ses variations en fonction de la température extérieure. Étude sur l'homme. Pp. 380–388.

Gaea. Leipzig. 37 *Jahrg.*

——. Kugelblitze über Wolken. Pp. 486–488.

Popular Science Monthly. New York. Vol. 59.

Bailey, Willis. Climate and Carbonic Acid. Pp. 242–256.

Waldo, Frank. The Blue Hill Meteorological Observatory. Pp. 290–304.

Philosophical Magazine. London. Vol. 2. *6th Series.*

Rose-Innes, J. On the Practical Attainment of the Thermodynamic Scale of Temperature. Pp. 130–144.

Kelvin, Lord. Nineteenth Century Clouds over the Dynamical Theory of Heat and Light. Pp. 1–40.

Ciel et Terre. Bruxelles. 22*me année.*

Tronquay, Georges du. Observation d'une trombe terrestre. Pp. 186–190.

Lancaster, A. Les refroidissements périodiques de mai. Pp. 205–209.

Scientific American Supplement. New York. Vol. 52.

—— Living Barometers. P. 21351.

—— Congress of Aeronautics. P. 21372.

Proceedings of the Royal Society. London. Vol. 68.

Steele, B. D. The Measurement of Ionic Velocities in Aqueous Solution, and the Existence of Complex Ions. Pp. 358–360.

Nature. London. Vol. 62.

Aitken, John. Atmospheric Electricity. P. 336.

Herschel, A. S. A Vertical Light-beam through the Setting Sun. P. 232.

Dewar, James. The Nadir of Temperature and Allied Problems. Pp. 233–234.

—— The Antarctic Expedition. Pp. 233–234.

S., M. Curious Raindrops.

Liveing, G. D. and Dewar, J. On the Separation of the Least Volatile Gases of Atmospheric Air, and their Spectra. Pp. 294–295.

—— The Total Eclipse of May 18, 1901. Pp. 289–290.

Zeitschrift für Gewasserkunde. Leipzig. 4 *Band.*

Oppokow, E. Das Verhalten des Grundwassers in der Stadt Neshin im Zusammenhange mit den meteorologischen Elementen. Pp. 76–99.

Gravelius, H. Die jährliche Periode der Regenmenge zu Marburg a | Lahn. Pp. 99–103.

Gravelius. H. Die Eisverhältnisse des Dnjepr. Pp. 103–108.

Journal of the Franklin Institute. Philadelphia. Vol. 152.

Balch, Edwin Swift. Antarctica: A History of Antarctic Discovery.

McClellen, William. Thermometer Glass at Higher Temperatures. Pp. 63–72.

Illustrirte Aeronautische Mittheilungen. Strassburg. 1901.

Emden, E. Theoretische Grundlagen der Ballonführung. Pp. 77–88.

Annales Agronomiques. Paris. Tome 27.

Giustiniani. L'humidité des terres et la dentrification. Pp. 262–285.

Archives des Sciences Physiques et Naturelles. Genève. Tome 11.

Ebert. Hermann. Les seiches du Lac de Starnberg en Bavière. Pp. 578–586.

Annuaire de la Société Météorologique de France. Tours. 49*me année.* 1901.

Lemoine, G. Les progrès de la météorologie en France dans la seconde moitié du XIX siècle. Pp. 113–124.

Meteorologische Zeitschrift. Wien. Band 18.

Bergholz, P. Die Luftdruckverhältnisse und die Windbewegungen im Fernen Osten. Pp. 241–250.

Mack, K. Ueber Wirbelbewegungen in vulkanischen Rauchwolken. P. 250–257.

Valentin, J. Die österreichischen Ballonfahrten beim Luftdruck-Maximum am 10 Januar, 1901. Pp. 257–270.

Obermayer, A. v. Aeltere Versuche zum Schutze gegen Hagelschläge. Pp. 270–273.

Hergesell, —. Vorläufige Mittheilung über die internationale Ballonfahrt am 19 April, 1901. Pp. 273–275.

—— **P.** Blaserna über das Wetterschiessen. P. 275.

Pernter, J. M. Die Erfolge des Wetterschiessens in Italien 1900. P. 275–278.

Hartmann, J. Ein Hilfsmittel zur Messung der Entfernung des Blitzes. P. 278.

Bohm, R. Chemische Untersuchung des in Oberweissburg, Post St. Michael im Lungau gefallenen rothen Schnees. Pp. 278–279.

Rona, S. Nachtrag zu den Bemerkungen über den Staubfall im März. Pp. 279–280.

—— Ein Blutregen in Brüssel im Jahre 1646. Pp. 280–282.

Pernter, J. M. Ungewöhnliche Abendbeleuchtung. P. 282.

—— Fünfzehn Grad absolute Temperatur. P. 283.

—— Die Rauchsäulen hoher Vulkane als Windfahnen. P. 283.

WEATHER BUREAU EXHIBIT AT THE PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.

By D. T. MARING, in charge of Installation.

The Weather Bureau exhibit at the Pan-American Exposition is located in the northeast corner of the North Pavilion, Government Building, and is adjacent to and forms a part of the official exhibit of the United States Department of Agriculture. The exhibit is shown quite completely in the accompanying illustrations—Plates I, II, and III—but can best be described under four general groups, or sections, as follows:

1. A collection of meteorological instruments and apparatus of latest improved designs, some in actual operation as employed at the more important telegraphic reporting stations of the Weather Bureau; kites and kite outfits as used in aerial investigations.

2. A collection of storm-warning flags and lanterns, with supports and towers, as used on the lakes and seacoasts for giving warnings of the approach of storms dangerous to shipping; model tower and weather flags.

3. A complete set of framed charts and publications of the Bureau, presenting clearly and graphically the climatic conditions of the United States; miscellaneous photographs of clouds, lightning, etc.

4. A map-printing and forecast section in daily operation.

1. METEOROLOGICAL INSTRUMENTS AND APPARATUS.

The general arrangement of this section of the exhibit is shown on Plate I, a view taken from one of the main aisles of the building, but does not include several instruments and apparatus on both the right and left hand.

For measuring atmospheric pressure the following are displayed:

Normal mercurial barograph, designed by Prof. C. F. Marvin. Records automatically and continuously the varying pressure of the air by means of a mercurial barometer tube suspended on a balanced scale beam. Aneroid barographs of the Richard pattern, such as are in actual use at 150 stations of the Weather Bureau. Nonrecording mercurial barometers of the standard pattern, in cases of special design, together with two sample barometers having sections cut out of the cisterns to show details of construction. For the especial benefit of the lake maritime interests there are also displayed samples of the best grades of compensated aneroid barometers, such as the patented Watkin, and others of English and French manufacture. These samples are loaned for exhibit by Mr. Julien P. Friez, of the Belfort Observatory, Baltimore, Md.

Air temperature apparatus.—Under the head of instruments for indicating and recording the temperature of the air we have: (*a*) The telethermograph, or transmitting thermometer, manufactured by Richard, Paris, in two forms; one is in actual operation with transmitter located in the instrument shelter on the roof and the register in the exhibit, and the other is shown complete in the exhibit. These instruments produce continuous and automatic records of the temperature of the air at a distance, and are especially desirable where the outdoor instrument shelter must be located some distance from the observer's office. (*b*) Thermographs of the regular pattern, such as are in actual operation at 150 stations of the Weather Bureau, and which produce a continuous and automatic record of the temperature wherever placed. (*c*) A col-

lection of sample thermometers of the several kinds regularly employed in meteorological work, viz: the mercurial exposed, for obtaining the current air temperature, dew-point, and humidity; the mercurial maximum, for recording the highest, and the alcohol minimum, for recording the lowest, air temperature. An instrument shelter of the standard (small) size is in position and use on top of the building (see Plate III), which is conveniently accessible for visitors by broad stairway.

Humidity: Psychrometers.—The question of relative humidity, or percentage of moisture in the air, is one that is closely connected with that of temperature. The standard instrument used by the Bureau for determining this element, consists of a geared apparatus, by means of which wet and dry bulb thermometers mounted thereon may be rapidly whirled and ventilated to insure accurate readings. A sample of this apparatus, together with one of more portable form known as the sling, or hand, psychrometer, is also shown. Samples of the hair hygrometer, of the so-called polymeter pattern devised by Lambrecht, of Germany, are also on exhibit (from the Belfort Observatory, Baltimore, Md.), to indicate some of the various forms of instruments that may be employed to determine humidity.

Precipitation: Rain and snow gages.—Of instruments for measuring precipitation (rain and snow fall) are shown: (*a*) The automatic weighing rain and snow gage, designed by Prof. C. F. Marvin, of the Weather Bureau. Two complete instruments are on exhibit; one is connected up on short circuit, and the actual operation of the mechanism is shown by dropping water artificially into the receiver, while the other has the gage part located on the roof of the building to receive and record on the register below all precipitation, in thousandths of inches, that may fall in that place. (*b*) Two of the improved tipping-bucket rain gages are similarly exhibited, that is, one is on short circuit, recording each hundredth of precipitation from water artificially dropped into the receiver, and the other is placed on the roof to catch and record actual rainfall. Over 100 stations of the Weather Bureau are now equipped with this pattern of recording rain gage. (*c*) The standard 8-inch (nonrecording) rain and snow gage. This is the well-known pattern in use at over 3,100 stations in the United States.

Wind velocity and direction apparatus.—For measuring and recording the direction and velocity of the wind, samples of the standard types of apparatus are installed. To obtain accurate directions and velocities of the wind it is essential that the wind vane and anemometer be given perfectly free exposures. To this end, one of the regular pattern 40-foot steel towers, as adopted for use at certain display stations, was erected on the roof of the building and the wind vane and anemometer were given elevations of 45 and 47 feet, respectively above the roof platform, and about 100 feet above the ground (see Plate III). The wind instruments thus exposed are connected electrically with a meteorograph in the exhibit, on the record sheet of which are automatically produced ink tracings and marks that record the direction of the wind for each minute of the day to eight points of the compass and the movement of the wind in miles.

Sunshine and cloudiness.—The important elements of sunshine and cloudiness, in daytime, are recorded by the Weather Bureau by two different forms of apparatus, models of each of which are shown. (*a*) The thermometric sunshine recorder, a form of differential thermometer, with clear and blackened bulbs, makes a record of sunshine electrically, each minute, by means of suitable wire connections with the meteorograph mentioned above. Two of these thermometric sunshine recorders are installed, one in the exhibit and the other in actual use on top of the 40-foot tower on the roof (Plate III). (*b*) The photographic sunshine recorder. This is a modified form of the Jordan photographic sunshine recorder, and gives the time and duration of each day's sunshine and cloudiness as traced by a minute beam of the actual sunshine on the sensitized (blue print) paper inclosed within the instrument. Interesting actual records are shown in an adjacent frame, and illustrate, graphically, the differences in the lengths of the days on similar dates in the southern and northern parts of the United States.

Station meteorographs.—The meteorograph, or triple register, mentioned above is now installed and in continuous operation at over 100 stations of the Weather Bureau throughout this country and the West Indies. As already referred to, this register, when properly connected with its various accessories, produces automatically the following records:

(*a*) The direction of the wind, to eight points of the compass, for each minute of the day (twenty-four hours).

(*b*) Each mile of wind movement, with the time in which made, from which the velocity is easily deduced.

(*c*) Each hundredth of an inch of rainfall (from the tipping-bucket rain gage) and the time required to collect this amount.

(*d*) The duration of sunshine and cloudiness during the time the sun is above the horizon (from the thermometric sunshine recorder).

A model wind vane in the exhibit, together with an anemometer with revolving cups, a thermometric sunshine recorder, and the bucket and frame of a tipping-bucket rain gage, are connected electrically with a meteorograph to illustrate graphically the methods employed in securing automatically the meteorological data above mentioned. Smaller forms of registers are also exhibited for obtaining records of wind velocity alone; wind velocity and sunshine; wind velocity and rainfall, or all three elements on the same record sheet.

Cloud observing apparatus.—In 1896–97 simultaneous, international cloud observations were made throughout the world by mutual agreement of the various national meteorological services. One of the cloud theodolites used in making these observations at Washington, D. C., is shown. By the aid of apparatus of this kind, two observers stationed about a mile apart and connected by telephone could locate with great accuracy the same point on any cloud under observation. An adjacent picture shows how the apparatus was actually used by each observer. The observations obtained were used in determining the actual height and velocity of clouds, and the results are given in the Annual Report of the Chief of Bureau for 1899. Near this apparatus is also shown one of the cloud nephoscopes and supports devised by Professor Marvin, and used at various stations of the Bureau in making cloud observations. By aid of a graduated plane mirror and its attachments, the azimuth, the angular altitude, the direction of motion and apparent velocity of motion of clouds are readily ascertained.

Kites and aerial investigations.—In kite apparatus there is shown a complete outfit as used in the field at one of the special kite stations. On the floor of the exhibit is a full size, standard, Weather Bureau kite of improved design, with a complete set of instruments attached thereto as in actual use, while near the ceiling of the building, in an opposite diagonal corner, hangs another kite of slightly smaller size, poised as in flight and connected by steel wire with a standard pattern hand reel which was actually used in making aerial investigations. The reel controls the kite in flight, and may be swung around to keep with the kite at any point of the compass. It is fitted with dials for indicating the length of wire out; a graduated rod and radius arc for showing the inclination of the wire to the horizontal plane, and has a dynamometer fastened to one of the crank handles for indicating, in pounds, the tension on the line. This reel, as well as the kite meteorographs and apparatus shown, were designed

by Professor Marvin, and some of the actual automatic records obtained with one kite from elevations exceeding 7,000 feet, are displayed near the larger kite. Observations on the angular elevation and azimuth of the kite, when in flight, were made by means of a circular horizontal mirror mounted on leveling screws. A sample of this instrument is also shown and is similar to the cloud nephoscope mentioned above.

2. STORM-WARNING AND WEATHER FLAGS, LANTERNS, ETC.

Owing to the great commercial importance of the City of Buffalo and the immense lake shipping interests centered at that point, special attention was given to this section of the exhibit, and the following were installed:

(*a*) *Storm-warning and weather flags.*—Draped on the walls at the back of the exhibit are full size hurricane flags, pennants, etc., while on the sides of one of the supporting pillars of the roof are a collection of small models of these flags (one-tenth actual size), showing the combinations possible, from the hurricane warning to the warning indicating the storm quadrants. Models of the regular weather and temperature and cold wave flags (one-tenth size) are similarly displayed on an opposite side of the pillar.

(*b*) *Storm-warning lanterns and supports.*—Four pairs of lanterns are displayed, viz: One pair (2) standard electric lanterns, with 12-inch Fresnel lenses (one red and one white), mounted rigidly upon a sample special 20-foot iron mast support, provided with iron steps; one pair (2) of the improved oil-burning lanterns, both with white 12-inch Fresnel lenses, but with the burner of one fitted with a red chimney, displayed as in actual use in one hoist, with ropes and tackle as attached to a wooden flagstaff, for example; one pair (2) of the marine 8-inch Fresnel lens lanterns (one red and one white), shown in one hoist as from a flagpole; one pair (2) of 4-inch Fresnel lens lanterns (models[1]), one red and one white, mounted as in actual use on the model tower. This tower is an exact fac simile in miniature (one-fifth actual size) of the standard 75-foot towers erected at display stations. All parts are clearly shown, in reduced scale, from the special drum and hoisting attachment for the lanterns to the miniature wind vane and arrangement of halyards for flags at the top, and the whole is nicely finished, nickel plated, and polished. This model was manufactured with great care by the contractors for the large towers, The Flint and Walling Manufacturing Company, Kendallville, Ind., and is neatly mounted on a polished oak pedestal. It forms an attractive corner of the exhibit, on the main aisle, and the lower portion may be seen conspicuously in center and front, Plate I. The model weather and temperature flags, as well as those for storm warnings, are displayed for the daily forecasts from the flagstaff of this model tower.

The full size 40-foot steel tower (combined wind instrument support), Plate III, is also especially adapted for the display of storm warnings by means of high-power lights, and is so used at various important stations of the Bureau.

Neatly designed pocket cards, in colors, explaining the various flags and warnings of the Bureau are freely distributed to all interested visitors.

3. FRAMED CHARTS, ETC., AND BUREAU PUBLICATIONS.

(*a*) *Charts and photographs.*—This section embraces a collection of 91 framed charts, etc., showing various meteorological phenomena. These are maps illustrating the climatic conditions of the United States, compiled and prepared from observations extending back to the establishment of the service in 1870; photographs of typical forms of clouds and of lightning and its effects, and miscellaneous photographs. These are mounted in classified groups on the walls of the exhibit (Plates I and II) and the data shown is supplemented by two composition relief maps of the United States in colors, giving the contour of land surfaces, and, in appropriate harmonious tints and lines thereon, the mean annual rainfall and temperature.

The collection is as follows:

Five framed climatic charts, showing rainfall, seasonal and annual.

Nine framed climatic charts, showing temperature data, from the mean annual to the highest, lowest, etc.

Three framed climatic charts, showing average barometric pressure for January and for July, and the mean annual.

Three framed climatic charts, showing average sunshine for January and for July, and mean annual.

Six framed sample Washington weather maps, showing the movement of a typical storm.

Five framed charts of actual automatic records obtained from standard Weather Bureau instruments.

One framed map, showing, geographically, the telegraphic circuits of the United States and the West Indies.

Six framed photographs of lightning and its destructive effects on trees, etc.

Twenty-one framed photographs of clouds; typical forms of various kinds.

One framed photograph (transparency), cumulo-nimbus clouds.

Eighteen framed photographs of various forms of kites and some of the experimental apparatus in the aerial investigations.

Six framed lake marine charts, showing water currents and fog conditions on the Great Lakes.

Seven framed photographs of miscellaneous subjects; Lake steamers; Weather Bureau buildings; Central Office of the Weather Bureau at Washington, etc.

One relief map (small), showing mean annual rainfall and temperature. (As furnished for special use at climate and crop section centers.)

One relief map (large), showing mean annual rainfall and temperature on a greatly enlarged scale.

(*b*) *Publications.*—Samples of the regular publications of the Bureau and such pamphlets as have been found of most interest to the general public are displayed, together with a set of station text and reference books, relating especially to meteorology and agriculture.

In this connection a blank book is provided wherein are noted the names and addresses of visitors who are particularly interested in meteorological matters, and requests for such publications as they may desire. The publications are forwarded gratuitously from the Central Office at Washington, if available.

To add to the completeness of this section and the exhibit generally, we are favored with a large lifelike portrait of the Hon. James Wilson, Secretary of Agriculture. There is also a framed photograph of Prof. Willis L. Moore, Chief of Bureau; and among the decorative effects on the burlap covered walls may be noticed a large plaster cast four feet in diameter, which is a reproduction in colors of the great seal of the United States Department of Agriculture. Every chart, instrument, and article of exhibit has a card with name and suitable descriptive legend thereon.

4. MAP PRINTING AND FORECAST SECTION. (Plate II.)

(*a*) *Weather map.*—In harmony with the enterprising spirit which prompted and has carried to completion this beautiful All-American Exposition, action was taken to perfect a new weather map that would embrace, with the United States, as

[1] These miniature lanterns are finished complete with oil burners, etc., and were constructed especially for this exhibit by Mr. Peter Gray, of Boston, Mass., the contractor for the standard patterns, all of which are of American manufacture throughout.

many as possible of the American republics to the south, and, of course, the contiguous territory of Canada and British America on the north. The size of the map was limited to 19 by 24 inches, and the territory actually included is from 10° to 55° north latitude (about 3,000 miles), and from 45° to 130° west longitude (about 4,200 miles), or over 12,000,000 square miles, the largest section of the earth's surface ever covered by a single synoptic weather chart made up from telegraphic observations. This map was engraved with the utmost care and printed in two harmonious tints of brown and green. Copies of the blank chart can be furnished to students of meteorology.

(*b*) *Weather forecasts and map printing.*—For the preparation of this map daily telegraphic reports are required from over 165 stations. These reports, passing over the regular telegraphic circuits, are received, translated, and tabulated at the down-town Weather Bureau office in Buffalo, and, as soon as the regular issue of maps has been printed, proofs, etc., are sent to the Weather Bureau Exhibit at the Exposition Grounds, four miles distant. Here the lines and data are rapidly transferred to stone for the printing of the souvenir edition on the large map described above. The exhibit is equipped with a telephone in connection with the city office, and while the small city maps are being prepared and printed, all data that can be transmitted in this manner, including the daily forecasts, etc., are rapidly passing over the line to the official in charge of the exhibit so that everything is ready for the transfer of the lines and tabular data when these are received. In this way the telegraphic observations taken at the 165 stations scattered over this vast extent of territory at 8 a. m., seventy-fifth meridian time, are being printed in colors (black and red) on the completed Pan-American Exposition weather map by 12 noon of the same date.

(*c*) *Printing press and accessories.*—For the printing of the above-described souvenir map the Weather Bureau is especially indebted to Messrs. Walter Scott & Co., Plainfield, N. J., who kindly loaned for the purpose the very handsome and complete two-color lithographic press, shown in Plate II. This is operated by a special 5-horsepower electric motor, constructed and loaned by The General Electric Company, of Schenectady, N. Y. Proof presses and all the necessary appliances for lithographic work are installed in this section, and the complete and special processes employed by the Bureau in preparing and transferring meteorological data to stone, and in the printing of weather maps therefrom, are conducted in full view of all interested visitors.

(*d*) *Folding machine.*—The large size of the map makes it essential that it be quickly and neatly folded for mailing or distribution, and a folding machine was arranged especially for this purpose and courteously loaned to the Bureau by the Dexter Folder Company of New York. This ingenious and useful machine is clearly shown near hand railing in front of press in the illustration, Plate II.

Souvenir envelopes printed in colors, showing the national ensigns of some of the more important American republics, together with cuts of storm and weather flags in daily use by the Bureau, were prepared for holding and facilitating the distribution of the maps. The maps are also posted daily in suitable frames conspicuously located in the more important buildings and thoroughfares on the Exposition Grounds.

(*c*) *Telephones: city and local.*—To facilitate the prompt receipt of weather reports, data for the maps, the daily forecasts, etc., and for the distribution of special warnings, the exhibit is fully equipped with both city and local telephones. By means of the latter and an exchange located on the grounds, all the more important buildings and exhibits of the Exposition can be promptly reached.

The exhibit is in charge of Mr. David Cuthbertson and a corps of assistants who have had many years' training and experience in the meteorological work of the Bureau, and they take pleasure in explaining the instruments, apparatus, etc., to all interested visitors. An effort has been made to make this very complete working exhibit of especial interest to the hundreds of voluntary observers of the Weather Bureau who will probably visit the exposition, and it is hoped that it may have a passing interest, at least, to all others who may see it[2].

[2] The illustrations accompanying this article were obtained through the courtesy of Mr. Harry H. Brigham, Assistant Representative in charge of the Exhibit of the United States Department of Agriculture, and Mr. David Cuthbertson, Forecast Official in charge Weather Bureau Exhibit. This favor, the many timely suggestions, and the cordial assistance rendered me by these gentlemen in the arduous work of installing our exhibit are gratefully appreciated.—D. T. M.

NOTES BY THE EDITOR.

HAIL AND THUNDERSTORMS IN OREGON.

Notable thunderstorms and hail occurred at Springfield, Lane Co., Oreg., 44° 5′ north; 123° west, and at Aurora, Palmer County, 45° 16′ north; 122° 50′ west. Springfield is in the valley of the upper Willamette, and Aurora is not far from the Willamette in the lower portion of its course. The following items are taken from special reports addressed by Climate and Crop correspondents to Mr. E. A. Beals, Forecast Official and Section Director at Portland, Oreg.

At Springfield Mr. J. S. Churchill says:

Saturday, May 25, 1901, was quite warm and sultry. At 2 p. m. a black cloud formed in the southeast and moved slowly in a northwest direction. Shortly afterward a similar cloud formed in the southwest and moved in a northeasterly direction. About 4 p. m. these two clouds were merged into one, moving violently over the country in a westerly direction accompanied by thunder, lightning, and hail. Hailstones, many of which were 1½ inches in diameter, fell thick and fast for a period of ten minutes, along with a deluge of water. The main storm of hail began at a point about seven miles east of the town of Springfield, and covered a space of from three to five miles wide and from seven to ten miles long. Near the center of the end of this path the wind developed to hurricane force, uprooting and breaking off trees three feet in diameter. Such a hailstorm has never been experienced before by the writer during his fifty years residence in Oregon.

Mr. J. C. Brattain, also of Springfield, says:

The hail extended over about six or seven miles in length and four in width. The stones were from three-quarters to one inch in diameter, but occasionally 2 inches; there were narrow strips in the storm's course from southeast to northwest where it was especially severe.

Mr. Charles J. Dodd, of Springfield, states that he rode over and examined a large portion of the area affected by the hail, and finds that the afternoon was quite warm, viz, temperature about 70° F., with a gentle breeze from west-northwest. Three distinct thunderheads made their appearance about 3 p. m. One formed in the coast range west of Cottage Grove, and drifted northeastward, another formed near Diamonds Peak in the Cascade range, and drifting rapidly northwest, followed the Willamette River. The third began west of the Three Sisters and drifted almost due west. At 3:30 p. m. these three clouds met about half a mile south and west of the town of Springfield. Here the destruction was greatest, and the width of the storm at this point was about two miles. It became suddenly very cool, the temperature fell to 45° F., the wind changed to southwest and the cloud swept toward the north or northeast. The total length of path was about sixteen miles with an average width of two miles. The damage done by the hail was between $10,000 and $20,000, while the size of the hailstones varied from one-fifth to two and one-half inches in diameter; in many cases two or three of these were frozen together; near the center of the track the average size might be compared to large sized English walnuts.

With regard to the storm at Aurora, Mr. G. Muecke reports as follows:

An extraordinary phenomenon of thunder and lightning occurred last night, which is of such rare occurrence in this region that the oldest inhabitants assured me to-day that they never experienced anything like it, some of them having lived around here since 1845.

Last evening at about 10:25, distant horizontal flashes of lightning commenced at the southeast, temperature 63°; no thunder was audible and the lightning was frequent, extending over a long range from extreme southeast to nearly east. This continued until after 11:15 p. m., when I retired. No doubt this must have continued further, for at 12:20 a. m. I was awakened by roaring thunder. Getting up at once, I watched the southeast and east horizon, which I viewed from this station, as formed by the Cascade Mountains, just about 50 miles distant.

Such intense flashes of lightning, illuminating the sky and country to the extent of almost bright sunlight, I have never before seen. What seemed to me very strange, however, was the fact that not once did the streaks of lightning form zig zags like those seen by me in the East and in Europe, in my youth. Last night's flashes were all vertical and inclined about 10° down to points either just west or just east of the Cascade Range. The streaks of lightning were mostly like half a spiral or corkscrew. But three times I saw a perfect "n" and once an "m." The thunder peals which followed were tremendous. I must remark that for half an hour I invariably counted intervals of from twenty to twenty-three seconds elapsing between the lightning and the thunder; for over half an hour the flashes occurred regularly every twenty-five to thirty seconds. The rain here during two hours amounted to only 0.29. At 1:15 a. m. the phenomenon ceased. The entire storm lasted two hours and fifty minutes, the longest continuous lightning and thunder I ever experienced.

METEOROLOGY IN FRENCH INDO-CHINA.

We copy from the Annales de Geographie, March, 1900, IX, p. 178, the following paragraph which shows that meteorological observations are now well established in a portion of the world from which we have hitherto received very fragmentary information.

For a long time past we have regretted the almost complete absence of meteorological observations in French Indo-China. This gap was especially to be lamented, from a scientific point of view, because it prevented us from extending our studies over one of the most interesting portions of Asia and, from a practical standpoint, because a knowledge of the climate is of primary importance for hygiene, colonization, and the rational utilization of the soil. The Central Meteorological Bureau of France had several times opened negotiations with the successive governors of Indo-China for establishing an adequate network of meteorological stations in that immense region, and the project was for a short time on the point of being realized by M. de Lanessan, when the latter was obliged to leave our colony. The project has just been revived and brought to a happy conclusion, thanks to the enlightened initiative of the present Governor-General M. P. Doumer.

The network of stations for the year 1900 has been constituted as follows, the principal stations being printed in capital letters:

In Cochin-China: SAIGON, CAPE SAINT-JACQUES, POULO-CONDORE, Ong-Yem, Tay-ninh, and Soc-trang.

In Annam: NHA-TRANG, LANGSA, TOURANE, Quin-hone, Hué, Dong-Hoi, Vinh, and Than-hoa.

In Tonkin: HANOI, Haiphong, Quang-Yen, Hon-gay, Mon-cay, Lang-son, Cao-bang, Lao-kay, Ha-giang, Bac-kan, and Van-bu.

In Laos: VIEN-TIANE, Luang-Prabang, Savannakhek, Khong, and Attopeu.

In Camboge: PNOM-PENH, Kampot, and Pursat.

In Yunnan and China: YUNNANSEN, Semao, Mongtzé, Lang-tchéou, Pakhoi, Hoï Hou, Kouang-Chau-Wan (Kouang-tchéou Ouan).

In the Gulf of Siam: Chantaboun, Bankok, and Singapore.

To these stations will be added a first class observatory, which will probably be established near Haiphong and where regular magnetic observations will also be made. All the scientific outfit of this observatory is due to the well-known liberality of M. Bischoffsheim; the greater number of these instruments have just been sent there.

It will thus be seen that this network of stations has been well conceived and very interesting results may be expected from the observations that have just begun to be made there. There are only two other things to be wished for, viz, that the new establishment may be permanent, and that on the other hand the means may be found for publishing the observations regularly—the only means of rendering them really valuable.

A RAIN OF SMALL FISH.

Mr. J. W. Gardner, voluntary observer at Tillers Ferry, S. C., reports that during a heavy local rain about June 27 there fell hundreds of little fish (cat, perch, trout, etc.) that were afterwards found swiming in the pools between the cotton rows in a field belonging to Mr. Charles Raley.

It is a well-known fact that in such rains all sorts of foreign objects, whether sticks or stones, frogs or fish, or even débris of destroyed houses and crops, occur occasionally not only in America but in Europe and elsewhere. It is very rare that we are able to trace these objects back to their sources, but there can be no reasonable doubt that they were carried up from the ground by violent winds, such as attend thunderstorms and tornadoes. Light objects, such as sheets of paper, have been identified as falling at points twenty or fifty miles distant from their starting point, but it is hardly likely that heavier objects, such as fish, could be carried so far without coming to the ground.

SUN SPOTS AND METEOROLOGY.

The question as to a possible relation between sun spots and terrestrial meteorology seems to have been started by Riccioli in 1651, as soon as physicists and astronomers fairly began to follow in the footsteps of Galileo. In 1800 Herschel suggested a relation between sun spots and the crops as depending upon the temperature of the earth. The memoirs of Fritsch, Vienna, 1854; Gautier, 1844; Arago, 1855; Zimmermann, 1856; Wolf, 1859, represent about all that was known on the subject before 1870.

In 1869, by comparing Wolf's sun-spot figures with various meteorological tables, I satisfied myself that the variations of solar radiation affect the terrestrial temperature so slightly that they are generally marked by local climatic peculiarities, but a special study of the observations on the summit of the Hohenpeissenberg near Munich (see American Journal of Science, 1870, vol. 50, p. 345) showed that the daily 2 p. m. observation gave a clear indication of the direct heating power of the sun and that the midday air temperature decreased at the rate of 0.008° R. for each unit of Wolf's tabular sun-spot numbers. There was also an indication of a period embracing about five sun-spot periods or 55.5 years, and a further possibility that the periodic changes in spots may have to do with planetary tides in the solar atmosphere.

Dates of maximum and minimum temperature.		Dates of maximum and minimum sun spot.
In the Tropics.	Beyond the Tropics.	
.....	1815 5	1816 8*
1822 5*	.....	1823 2
.....	1825 8*	.....
1830 1	.....	1829 5*
.....	1831 9	.....
1833 1*	.....	1833 8
.....	1834 2*	.....
1836 4	.....	1837 2*
.....	1837 8	.....
1842 8*	.....	1844 0
.....	1846 4*	.....
1847 6	.....	1848 6*
.....	1850 3	.....
1854 7*	.....	1856 2
.....	.....	.....
.....	.....	1860 2*
.....	1861 6	.....
.....	.....	1867 2
.....	1868 7*	.....

*The maxima are indicated by the star.

Koeppen states that at that same time he began collecting his material for an investigation on the broadest possible foundation, the results of which he published in the Meteorologische Zeitschrift, 1873, Vol. VII, pp. 241 and 257. He collated all available series of observations at stations embracing three years or more of continuous work and wove them into a homogeneous system of groups, twenty-five in all, representing the years 1731–1871 and covering the whole

Northern Hemisphere as far as practicable. Koeppen concludes that in the tropical regions the maximum temperature of the air occurs from one-half year to one and a half years before the minimum of solar spots, but that outside of the Tropics the temperature maxima occur later than the spot minimum to the extent, in one case, of three years; further, that the regularity and magnitude of the periodic variations of temperature diminish with great regularity from the Tropics toward the pole, so that, for instance, the variation which is very pronounced between the years 1830 and 1840 becomes almost inappreciable as we pass from the Tropics to the Arctic regions. This relation is summarized in the preceding table.

In connection with the above table, Koeppen has compared the minimum temperatures with the maximum sun spots. On the average, he finds that the minimum precedes the maximum sun spot by a year in the Tropics and the maximum temperature precedes the minimum sun spot by a similar amount. If, however, we adopt a slightly different way of comparing the data, we find that in the Tropics the maximum temperature follows the maximum sun spot and the minimum temperature follows the minimum sun spot by about four years. Now, there is, a priori, no reason why this latter arbitrary comparison is not just as rational as the one adopted by Koeppen, since the average temperature of the atmosphere at any place is affected by the wind and cloud indirectly quite as much as it is by the sun directly. This principle is recognized by Koeppen when he says that the systematic change of period in passing from the Tropics toward the pole is difficult of explanation, but must depend upon the general circulation of the atmosphere with its evaporation, cloud, and rain.

Like most other investigators, Koeppen concludes that we have overwhelming evidence of an intimate connection between the spots and the temperature, the extreme range of temperature being about 2° C. for the extreme range of sun spots, but we have not yet any clear idea of the precise nature of the connection. We may, however, be certain that the spots do not act simply by darkening a portion of the solar disk, for the temperature of the earth's surface is a summation of the solar influence so that a change at the earth must occur later than the change in the solar radiation.

In the article by Mr. H. H. Kimball, printed on a preceding page, he brings out the general principle that the question as to whether the thermal radiation of the sun has a periodicity similar to that of the sun spots can not easily be settled by observations of temperature on the earth because of the complications introduced by our atmosphere, but that on the other hand it may be plausibly attacked by the study of the lines in the solar spectrum; that the widening of the lines in connection with the increased number of prominences bespeaks an increase in the temperature and if these run parallel to the sun-spot phenomena, then some relation between solar spots and solar temperatures is made out, whence we may plausibly argue that there should be a thermal effect somewhere on the earth, although not necessarily at the base of the earth's atmosphere, since the variable solar radiation may be absorbed only in the upper air. This appears to be the line of thought adopted by Sir Norman Lockyer in investigating the question whether the solar radiation absorbed in the upper air may not directly affect the clouds and the rainfall although inappreciable to the thermometer at the earth's surface. The latest paper on the subject, by the younger Lockyer (William J. S.) is published in the Proceedings of the Royal Society, June 24, 1901, LXVIII, pp. 285–300. In this article, "On the solar activity, 1833–1900," he compares the total amount of spotted area and the variation in magnetic and other terrestrial phenomena. As to the magnetic phenomena there can be no doubt; it has always been recognized that the parallelism was so close as to bespeak a common origin. It was in attempting to understand the nature of this connection that Prof. F. H. Bigelow was led to his hypothesis that the variation in solar radiation was of such a nature that it might be treated as an electro-magnetic effect, since, according to modern physics, electric phenomena are simply cases of wave motion in the ether, entirely analogous to light and radiant heat, and are mutually interconvertible. Lockyer finds also a 35-year period in the sun spot, and as this agrees with Brückner's 35-year period in terrestrial climates, he seems to suggest that there must be a connection between the sun and the earth, such that the slight 35-year variations in climate depend upon the rather more pronounced 35-year period in the sun spot, the aurora, and the magnetic storms. He finds no indication of the 55-year period suggested by Dr. Wolf.

We are informed that at a meeting of the Astronomical and Physical Society of Toronto, apparently held in May, 1901, Prof. R. F. Stupart communicated the results of a new inquiry into the relation between sun-spot figures and the rainfall of the lower Lake region. An official copy of this paper has not yet been received, but according to a letter of Mr. Arthur Harvey in the Toronto Mail and Empire—

> It appears that from the conditions prevailing in October those which are to prevail the next May can be foretold with great probability. If this statement is correct, it would seem that long-range forecasting has entered upon a new stage of development.

As the periodicities in sun spots, the width of the spectrum lines, the magnetic and auroral phenomena are sufficiently well marked to be satisfactorily demonstrable while the corresponding variations in pressure, temperature, wind, and rainfall are small, elusive and debatable, we must caution our readers against being carried away by optimistic promises. It certainly is impressive to the thoughtful mind to realize that there is even a slight connection between solar and terrestrial phenomena but the delicacy of this connection is such that it still remains true that the study of meteorology is essentially the study of the earth's atmosphere as acted upon by a constant source of heat, the sun. None of these astrophysical studies should tempt the meteorologist to wander far from the study of the dynamics of the earth's atmosphere and the effect of the oceans and continents that diversify the earth's surface.

METEOROLOGY IN THE UNIVERSITIES.

Among the announcements of changes at the Johns Hopkins University we find the following line: "Oliver L. Fassig, Ph. D., now instructor, promoted to be associate in meteorology." This recognition of Dr. Fassig's good work, both as a teacher of meteorology and an officer of the State Weather Service must be encouraging, not only to him personally, but to those who hope to see meteorology firmly established as a university course at all of our larger institutions of learning.

In general, meteorology continues to labor under the disadvantage of failing to secure distinct and independent recognition in our colleges and universities. Some treat it as a small branch of geography, others as belonging to geology; many class it with the mathematical and experimental physics; in a few cases it keeps its ancient association with chemistry and natural philosophy. One might wonder whether the atmosphere is of such vital importance to all that all clamor for the honor of teaching what little we know about it. There can be no objection to giving it a place under geography if that title be made to include the whole range of studies pertaining to our globe, but as this is never the case we believe that our subject is of sufficient practical importance and intellectual dignity to warrant giving it full recognition. Call it by its own name and give it a home of its own.

The annual announcement of the department of geology and geography, under the faculty of arts and sciences of Harvard College, shows that the assistant professor of climatology is Prof. R. DeC. Ward and the assistant in meteorology is Frederick M. Wilder. According to the classification adopted at Harvard, meteorology and climatology belong to the general subject of geography and the courses of instruction offered in these lines are as follows:

Meteorology (elementary course).—Lectures, written exercises, observations, and laboratory work. Half course (second half year). Monday, Wednesday, and Friday at 11; a laboratory conference of one hour on Tuesday, between 9 and 1, and additional laboratory hours during the week. Assistant Professor Ward assisted by Mr. Wilder. (IV.)

Meteorology (second course).—Lectures, written exercises, and observations. Half course (first half year). Monday, Wednesday, and Friday at 11, and additional laboratory hours. Assistant Professor Ward.

General climatology.—Lectures, library work, and a thesis. Half course (first half year). Monday, Wednesday, and Friday at 2:30. Assistant Professor Ward.

Climatology of the United States.—Lectures, library work, and reports. Half course (second half year). Monday, Wednesday, and Friday at 2:30. Assistant Professor Ward. (VII.)

Of the four courses above mentioned, the first two are intended, primarily, for under graduates; the two latter are intended for the higher classes and possibly for post graduate students having satisfactory preparation. These courses are usually taken in connection with courses in geology, medicine, engineering, and geography. They should also be taken by those who pursue courses in pedagogy with a view to becoming practical teachers of physical geography in high schools and normal schools.

A similar course is carried on at Johns-Hopkins University by Dr. O. L. Fassig, without interfering with his duties as a section director in the Weather Bureau. His courses of lectures next year for students and school teachers, respectively, will be somewhat more extensive than those delivered during the past year. These latter numbered in all seventeen; a complete synopsis of each was circulated at the time of delivery, and the collected synopses form an excellent suggestive basis for a treatise on meteorology or for the preparation of other courses of lectures. These lectures form a part of the system of instruction in advanced physical geography, and are organized under the department of geology.

THE INTERNATIONAL METEOROLOGICAL CONGRESS, PARIS, SEPTEMBER 10-16, 1900.

Through the kindness of Professor Angot, Secretary of the International Meteorological Congress, held in connection with Exposition of 1900 in Paris, the Editor has lately received an early copy of the forthcoming proceedings of the congress. Among the many items mentioned therein, perhaps the following will be interesting to American readers.

In his opening address President Mascart, after alluding to the fundamental source of all meteorology, namely, the action of the solar radiation on the land and water of the globe, says:

> If this view is correct, we see how important must be the study of the upper regions of the atmosphere, of its temperatures and its winds, and of the distribution and transformation of the clouds. * * * We are on the way to realize the complete scientific conquest of the atmosphere. We shall perhaps soon see aerial stations furnishing daily reports adapted to improve the present imperfect service of weather predictions.

With regard to the moon, he says:

> Denials and one-sided statements are not scientific. Every sincere research merits discussion, and the question of the moon is not yet exhausted.

With regard to terrestrial magnetism, he says:

> Here we perceive the periodicity of sun spots, and the perturbations are often accompanied by polar auroras, which express, under another form, the disturbances of the upper regions. These (electric) currents circulate for the most part within the crust of the earth, but the diurnal variations would seem equally to show that a current exists in the atmosphere; possibly also there may be an exchange between the ground and the air.

The second session opened with the reading of the first memoir by Hepites of Bucharest on the Rainfall of Roumania.

Dr. Assmann, as Chief of the Aeronautic Division of the Meteorological Service in Berlin, presented the first copy of the great work on scientific balloon voyages executed by the German Aeronautic Society in Berlin, and edited by Assmann and Berson. He said:

> These volumes show, without any doubt, that in the contest between the observations by Glaisher and modern thermodynamic theories, it is the theory that has achieved the victory. * * * *

The first volume contains the general history of the scientific balloon, and the subsequent development of modern scientific balloons. The instruments and methods of observation, calculation, and deduction have been discussed and, finally, all the original data are given as resulting from seventy-five scientific ascensions by Berson. The second volume contains the description and results of special ascensions during the years 1888–1899 undertaken by different officials, each of whom describes and discusses his own work. The volume closes with the results of self-registers, both in captive balloons and sounding balloons. The third volume contains discussions of the general results with regard to temperature, moisture, clouds, the wind, solar radiation, and atmospheric electricity, concluding with an important theoretical chapter by Professor von Bezold. The editors expressly protest against any intention of considering this work as a complete discussion of the material thus far collected. On the contrary they hope that much and better scientific results will follow. The three volumes, in large quarto, make a very imposing appearance, and constitute a worthy dress for this important contribution to our knowledge. The most impressive event of the meeting immediately followed Dr. Assmann's remarks, in that President Mascart addressed a telegraphic dispatch to the aged meteorologist and aeronaut, Mr. James Glaisher, the nestor of meteorologists, expressing the congratulations of the congress that he had lived to see the great progress accomplished by means of balloons.

The second memoir was then read by Dr. Börnstein on the Variation of the barometer during the siderial lunar month. This memoir is published in full at the end of the proceedings, and maintains that the hourly records at numerous stations during the past twenty years, show a simple oscillation during the siderial month whose maximum and minimum pressures occur some days before the southern and the northern lunistice. The total range of this oscillation is from two to four millimeters. It agrees, therefore, in general, with the results deduced by A. Poincaré, from the study of the daily weather maps of the Northern Hemisphere that were published for many years by the Chief Signal Officer of the Army.

M. Lemoine presented a paper on the Prediction of river floods in France, which is also printed among the memoirs.

Much interest was shown in a communication by Sprung, director of the meteorological observatory at Potsdam, describing an automatic apparatus for the photogrammetric measurement of the height and motion of the clouds. The two parts of the apparatus are established at Potsdam, about 1,500 meters apart, and Dr. Sprung exhibited a large number of photographs obtained with this apparatus, some of which show very clearly the importance of his researches on

the dynamics of the atmosphere. His memoir is the fourth of this collection.

The remarks of M. Durand-Gréville on the Mammato-cumulus, are printed in the proceedings, and have in fact, also been printed elsewhere. But his article on some barometric changes that accompany a thunderstorm is published as the fifth of the memoirs.

As some confusion seems to prevail relative to the nomenclature of mammato formations, the Editor hopes to have an early opportunity to speak on this subject.

M. Crova announced that the brother of M. E. Roche has undertaken to publish a collection of the memoirs of the latter, reprinted from various sources, and an early copy of this volume was presented to the congress by M. A. Roche.

The meteorological service organized in Spain and the Balearic Isles was described by M. Gorria y Royan whose paper is published as the sixth memoir.

M. Edelstam, Civil Engineer of Upsala, on behalf of Prof. Knut Angström, read a short but important paper by the latter on Actinometric observations at various altitudes, and on the electric compensation pyrheliometer. This paper presented the results of observations made with Angström's new instrument at Teneriffe during the summers of 1895–6. The errors of measurement probably do not exceed 1 per cent; the accuracy of determination of the solar constant is, however, limited by our uncertainty as to the laws governing the absorption of heat by the atmosphere; owing to this it is not yet possible to state with confidence, whether there will be any material alteration of the value hitherto adopted.

The seventh memoir is that by Ernst, of Zurich, on the graphical methods of presenting the weather.

Hilderbrandsson, of Upsala, gave a summary of his official report on the results of international measurements of the heights and movements of clouds. Among these results, he mentions the following: (1) The altitudes of clouds, especially the upper clouds, diminish from the equator toward the pole, as do also the ranges between the maximum and minimum altitudes. (2) The altitudes in general increase with the temperature of the air at the surface of the ground. There are, however, many exceptions to this rule. (3) The altitudes generally increase with the pressure of the air up to a pressure of 760–770 millimeters, but only to again decrease when the pressure becomes greater. (4) There is no clear relation between the height of the clouds and the direction of the barometric gradient. (5) The velocity of the wind at all cloud altitudes is greater in winter than in summer. (6) This velocity increases as the north latitude diminishes, at least down to the latitude of Washington. On the other hand, at Manila the velocity is very small—much smaller even than at Bossekop, near the North Cape. This probably results from the fact that the Philippines are situated at the boundary between the east winds of the tropical zone and the west winds of the temperate zone. (7) The mean direction of the upper winds is nearly always from east to west within the Tropics and from west to east in the temperate zones. (8) In the temperate zones the west wind has generally a component toward the equator in the winter time and a component toward the pole in the summer time; for example, in Europe the wind is between wnw. and nw. in the winter time and between wsw. and sw. in the summer time.

Hildebrandsson exhibited and explained the resultantometer, an instrument invented by Sandström in order to mechanically determine the amount and direction of the resultant of many observations of the wind. Angot stated that an analogous instrument, constructed many years ago by Besson, is described in the Annuaire of the Meteorological Society of France.

The director of the Meteorological Service of Japan, M. Nakamura, presented a memoir on the diurnal variation of the temperature at Tokio, which is printed as the eighth memoir. He also exhibited and explained the soroban, a sort of abacus, or calculating machine, used in the extreme East from the most ancient times, and which, by the simplicity of its construction and use, is superior to all the calculating machines employed in Europe. The soroban is composed of a series of vertical parallel rods, on each of which are strung six balls; each rod is intersected by a horizontal bar; one of the balls is on the upper side of this bar, the other five on the lower side. The upper ball represents five units of the order corresponding to one of the lower balls. By sliding either the upper ball or one or several of the lower balls along the horizontal bar, one can represent any figure whatever, and consequently any number by combining the balls of the different rods. This instrument can be used simply and rapidly for addition, subtraction, multiplication, division, and even the extraction of square root.

Dr. Steiner, of the Hungarian Meteorological Institute, expressed the interest that would be found in an annual publication constituting a repertorium of all meteorological publications, and desired that the congress should pass a vote to the international committee to consider this question. M. Rücker remarked that this subject had already been fully provided for in the publication undertaken by the Royal Society of London of a general bibliography of all the sciences.

Father Algué, of Manila, presented the ninth memoir, on the Relation between the microseismic movements of the soil and cyclonic storms.

Dr. Sprung, of Potsdam, in the tenth memoir, compared the duration of rainfall as measured by self-registers with that obtained by estimation, according to Koeppen's method, and finds that the latter gives results two or three times larger than the former, and is to be recommended.

The eleventh memoir was also by Dr. Sprung, on a Telemeter for measuring the heights of clouds. This is the new stereo-telemeter constructed by Zeiss at Jena some five years since, and is the only one that can be used upon objects when they are in motion. It is described in the eleventh memoir of the appendix.

M. Balif, delegate from the Government of Bosnia-Herzegovina, read a report on the Meteorological organization in that country and the results of rainfall observations.

Captain Chaves explained the condition of the meteorological service of the Azores.

M. Nakamura presented a number of his memoirs on the organization of the meteorological service of Japan.

Professor Piltschikoff, of Odessa, presented photographs and a memoir on lightning, also a paper on the polarization of sky light, which are published as memoirs twelve and thirteen.

At the fourth session memoir by M. Chaumeil, on an Improvement in the rain gage was read by M. Angot.

The fourteenth memoir was that by Marchand, Director of the Observatory on the Pic du Midi, and was entitled On the relations between the solar phenomena and those of terrestrial physics.

Van Bebber, of the Deutsche Seewarte, presented a copy of the Decade Bulletin of that institution.

The fifteenth memoir was that of M. Garrigou-Lagrange on the General movements of the atmosphere in relation to the positions of the sun and moon.

Dr. Onimus spoke of the desirability of replacing the expression "tension" of aqueous vapor by some other word such as that of "pressure." He also presented an apparatus for measuring the intensity of light.

The sixteenth memoir was that by Paulsen, of Copenhagen, on the Spectrum of the aurora.

M. Rouna, in the name of M. DeKonkoly described the new meteorological and magnetical observatory established at O' Gyalla, and M. A. L. Rotch spoke of the principal results at Blue Hill.

In the seventeenth memoir M. Leon Teisserenc de Bort gave a summary of the systematic atmospheric soundings that have been taken at his observatory for dynamic meteorology at Trappes, near Paris, since April, 1898. Two hundred and fifty balloon ascensions have been made, and the height of 10,000 meters, or more has been attained 104 times. Nearly all these balloons were of varnished paper, and the capacity varied between 50 and 88 cubic meters. Notwithstanding their small size they attained altitudes of 14,000 meters or more, about twelve times.

The kite ascensions have been very numerous, and rapid progress has been made since we have learned to make up the line in a rational manner, which permits keeping the average inclination of the wire constant whatever may be the length of the line. This system is peculiar to the observatory at Trappes; the highest ascension was 5,150 meters on the 10th of August, 1900. By employing the same system of line, Assmann has attained 4,600 meters, and it is not to be doubted that still greater altitudes can be attained.

Prof. A. J. Woeikoff, of St. Petersburg, spoke of the necessity of studying the upper regions of the air under the Tropics and in the interior of Asia. Others, replying to this, while recognizing its importance, laid stress upon the material difficulties of work experienced in that country.

The eighteenth memoir was by M. Ventosa, on the Determination of the direction of the upper winds by means of the undulations of the images at the edges of the stars. Pernter, of Vienna, announces that a very different view of the subject from that taken by Ventosa is expressed in a forthcoming memoir by Exner.

M. Hervé announced that he has prepared a general bibliography of aeronautics and the dynamics of fluids. This bibliography will be published in Vols. IX–XII of the Revue de l'Aéronautique.

The nineteenth memoir was by M. L. Pallazzo, Director of the Central Meteorological Bureau of Italy, in which he described the organization of the stations established in northern Italy in order to study thunderstorms and check the results obtained by the bombardment of hail clouds.

The twentieth memoir, by M. F. Houdaille, gave a résumé of his mission to upper Italy in 1900 in order to study the organization of the bombardment of hail. M. Rona, Assistant Director of the Meteorological Service of Hungary, gave a résumé of the experiments made in his country to protect the crops from hail by cannonading. He stated that the institute is not yet in a position to give a decided response as to the success of this method, since the problem of the formation of hail is not yet understood, but he could not deny, *a proiri*, that there may be a possibility of success, and he would remit the decision to the experience of many years. The experience of one year will not suffice as a basis for a definitive judgment as to the success of this method. Certainly the people themselves are enthusiastic.

Professor Pernter, of Vienna, remarked that it was necessary to be very conservative with reference to practical results that seemed to have been produced. The experiments made by himself and Trabert showed that in most cases the smoke ring from a cannon did not reach to the height of the clouds.

M. Capus, a delegate from French Indo-China, gave details as to the meteorological work in that country.

The twenty-first memoir was by M. Sprung, who explained his balance barometer of most recent construction. He also remarked that the same method of construction appears in the Marvin barograph and the Marvin self-registering rain gage.

The twenty-second memoir, undoubtedly a very important one, was by Rykatcheff, Director of the Central Physical Observatory at St. Petersburg, and gave the result of a comparison of temperatures and humidities observed under different kinds of shelters parallel with measurements made by means of Assmann's aspiration psychrometer.

M. Kesslitz, chief of the meteorological and magnetic service at Pola, Austria, proposed that the congress recommend that all meteorological services and institutions contribute to the systematic seismological observations and publish them in the daily telegraphic bulletin. This proposition seems to have originated in the Academy of Sciences at St. Petersburg.[1]

Captain Chaves stated that the daily dispatches from the Azores always included earthquake phenomena. The proposition of M. Kesslitz was referred to the international permanent committee.

Father Dechevrens spoke upon the variation of the temperature with altitude within cyclones, as shown by the observations on the tops of mountains. He explained the misapprehensions that seem to exist relative to his announcements of 1886 and 1887, to the effect that from the level of the ocean, and up to an altitude of 1,200 meters, the temperature within a whirlwind, either cyclonic or anticyclonic, varies inversely as the pressure, while in layers above this altitude it varies as the pressure.

Paulsen, Director of the Danish Institute, explained his method of measuring the electric potential of the air as used by him in Iceland in 1899–1900.

The twenty-third memoir was by Teisserenc de Bort, and presented a résumé of the principal results as to the vertical distribution of the temperature deduced from sounding balloons and kites.

M. Hergesell gave some account of the labors of the aeronautic committee, following which the congress resolved that the progress of meteorology demands that international simultaneous balloon ascensions be made periodically at fixed dates, that these ascensions should be supported by kite ascensions and cloud observations; that all institutions for meteorological study, or for military ballooning, should be invited to participate in these ascensions.

The twenty-fourth memoir was by Mr. Walz, giving a report on the collaboration of the Weather Bureau, with the works of the international committees. Mr. Walz also submitted to the conference copies of Professor Bigelow's report on the international cloud work.

Mr. Wragge, of Queensland, Australia, after giving some details about the organization of his service, submitted the twenty-fifth memoir, A note on the mountain observatories of Kosciusko (2,235 meters altitude) and de Merimbula (near the base of Mount Kosciusko, in New South Wales).

Finally, Dr. Blitz, of London, presented a communication on the Principles of meteorology; but President Mascart explained that an especial point of view elaborated in this paper removed it from the list of questions that could be advantageously discussed in this general assembly.

The sessions of the special committees on international meteorological telegraphy; on solar radiation; on cloud observations; on terrestrial magnetism, and on scientific aeronautics are also reported in full in this volume of proceed-

[1] About 1885, at the instigation of the Editor, an attempt was made to form a joint organization between the different governmental departments in Washington, interested more or less directly in earthquakes. The meetings of the committee promised to result in considerable addition to our knowledge, and to an organized system of observation. New forms of apparatus were devised and constructed, but unfortunately the movement was not kept up. It would not be difficult for the Weather Bureau to collect and publish crude earthquake reports, but it is not likely that such publication would add much to exact science, and it is undoubtedly more proper to wait until such work is recognized as one of the duties of the United States Geological Survey.

ings, and add eleven more memoirs to the above list, making thirty-six in all, so that the whole constitutes one of the most important recent meteorological publications and gives one a clear impression as to the advanced problems that agitate meteorology at the close of the nineteenth century.

The editorial work, by Professor Angot, has been executed most conscientiously and the pages bear no evidences of the many vexatious annoyances and delays to which he was subjected in the course of the work.

KNUT ANGSTROM ON ATMOSPHERIC ABSORPTION.

While the recent Bulletin G by Prof. F. W. Very, on atmospheric radiation was in press, Prof. Knut Angström of Upsala, was preparing a short paper on the part played by aqueous vapor and carbon dioxid gas in the phenomena of absorption in the earth's atmosphere, which was published in the Annalen der Physik immediately afterwards. In this memoir based on unpublished researches of Dr. J. Koch at Upsala, on the absorption of radiation from heat sources at different temperatures by various depths of gas, Professor Angström approximately determines the influence of a layer of carbon dioxid gas 30 centimeters thick and under a pressure of 780 millimeters, absorbing the radiation from a black body at 100° temperature, and finds that it is about 10 per cent and that it does not change more than four-tenths of one per cent of the original radiation when the pressure is decreased to 520 millimeters. He infers, therefore, that a layer so thick as to be equivalent to that contained in the earth's atmosphere will absorb about 16 per cent of the earth's radiation, and that this absorption will vary very little with any changes in the proportion of carbon dioxid gas in the air. This limitation of the absorption to spectral regions between definite wave lengths is also rendered very probable by Paschen's observations in the Annalen der Physik, volume 51, page 33.

The influence of carbon dioxid gas in absorbing the direct radiation from the sun is more difficult to determine; it certainly absorbs all the broad band designated by the letter Y in the solar spectrum, but this does not amount to more than one-fifth per cent of the total solar radiation.

An attempt is made to determine the absorptive effect of aqueous vapor on the total solar radiation. By passing a smooth curve tangent to the maxima of the energy curve of the solar spectrum between 0.3 and 4.0 microns, and assuming, what is no doubt true, that the difference between these curves is principally due to the absorption of aqueous vapor, minimum values of 15 and 27 per cent are obtained for this quantity with solar altitudes 32° and 5° 40′, respectively, the pressure of the vapor of water being 3.3 millimeters and relative humidity 70 per cent at noon. An additive correction of 5 per cent is made to allow for the absorption of solar rays of greater wave length than 4 microns, giving 20 and 32 per cent, respectively, which are considered to be maximum values of the aqueous absorptions under the given conditions. But since the total radiation had diminished from 1.320 to 0.627 small calories, or by more than 50 per cent, between the high-sun and the low-sun measurements, and as a considerable part of this additional loss is undoubtedly to be attributed to the vapor of water, one or the other of the maximum values assigned for the absorption of total solar radiation by aqueous vapor may possibly need to be doubled.

The remainder of Angström's paper is devoted to a destructive criticism of the theories put forth by the Swedish chemist, S. Arrhenius, in which the total absorption of CO_2 is quite inadmissibly inferred from data which include the combined absorption of CO_2 and the vapor of water. On these incorrect premises Arrhenius has founded an hypothesis as to the cause of the Ice Age, attributing it to variation in the amount of atmospheric CO_2. The geologists who have adopted Arrhenius's views should recall that his hypothesis evidently fails in the light of present knowledge of the absorptive powers of carbon dioxid.

Undoubtedly the aqueous vapor powerfully absorbs the terrestrial radiation, but no quantitative estimates of its effect are made by Professor Angström.

The preceding preliminary statement by Angström is of interest in connection with the very instructive article published by Maurer in the Meteorologische Zeitschrift for May, 1901. A translation of this article will be interesting, not only on account of its high appreciation of Professor Very's work, but because of its instructive presentation of the present state of our knowledge of the obscure but very important details of atmospheric radiation and absorption.

On the basis of Very's quantitative determinations of aqueous absorption in certain special cases, Maurer adopts the value of 75 per cent for the atmospheric absorption of radiation from a terrestrial surface at the freezing point, obtaining thereby the further estimate of 0.052 small calories per minute as the radiation from such a surface toward space. But, as is evident from the variation in the aqueous absorptive power, which Professor Very has demonstrated and which he attributes to the varying complexity of the vaporous molecules, depending upon the prevailing relative humidity, such estimates must be subject to a wide range of uncertainty.

A more exhaustive report on the general subject of atmospheric absorption will be published in a few months in the MONTHLY WEATHER REVIEW.—*F. W. V.; C. A.*

ERRATA.

MONTHLY WEATHER REVIEW for April, 1901, page 176, column 2, interchange lines 24 and 26 from the bottom.

MONTHLY WEATHER REVIEW for May, 1901, page 212. In table of meteorological observations at Honolulu, make max. sea-level pressure for the 12th read, "30.11", instead of "29.11."

MONTHLY WEATHER REVIEW for May, 1901, page 213, column 1, line 4, in the expression "thirty-four of new forms," omit the word "of." Page 211, rainfall table for Hawaii, column 2, heading for "elevation," read "elevation approx." Page 211, table of rainfall data for Hawaii, column 2, for "Kukuinaele," read "Kukuihaele;" for "Kohola," read "Kohala;" for "Hawi Mill," read "Hawi;" for "Kipahullai," read "Kipahulu;" for "Keomoku," read "Keomuku;" Manoa, "Woodlawn D" should read "Woodlawn Dairy;" for "Maakiki" (reservoir), read "Makiki," and add approximate elevation "150 feet;" Nuuanu (electric station), elevation, for "450," read "405" feet; for "Waimamalo," read "Waimanalo;" for "Wahiawa, Mount," read "Waiawa, Mountain;" Olowalu, annual normal rainfall, add "8.80" inches; transfer annual normal rainfall "34.80" inches from "Haiku" to "Kula (Erehwon)." Same page, column 1, line 9 from bottom, highest mean temperature at sea level, for "84," read "86."

Page 212, column 1, line 6, extremes of precipitation, for "0.07 at Niulii," read "0.02 at Awini;" same line, for "Wahiawi, Mount Kauai," read "Wahhiawa Mountain on Kauai Island. Same page, column 1, line 4 from bottom, barometer, greatest 24-hour change, for "0.9," read "0.09;" column 2, line 7, Kapiolani Park, for "—," read "no report;" line 29, average temperatures, Oahu, add "mean 75.4°."

Page 219, "Hail Insurance," column 2, line 13, "167,340,000," should read "167,270,400;" line 16, for "1,000,000," read "5,000,000" tons; line 20, for "5,000,000 foot-tons," read "five thousand million;" lines 30 and 31, "by an engine of 1,000,000 horse-power, and therefore represents the work," to be struck out, and line 31, "1,000,000," should read "5,000,000;" line 33, "local winds," should read "forces of evaporation and diffusion."

THE WEATHER OF THE MONTH.

By ALFRED J HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR JUNE.

June, 1901, was a fairly typical summer month. The greater number of the lows that were charted during the month originated on the eastern edge of the middle Rocky Mountain region and drifted slowly northeastward, dissipating in the Lake region or the St. Lawrence Valley. The movement of the highs was eastward over the northern circuit, rather than southeastward across the interior of the country.

During the latter part of the month the weather became unusually warm in the lower Missouri and middle Mississippi valleys. At the close of the month the heated area included eastern Colorado, Kansas, the adjoining portions of Nebraska and Oklahoma, the whole of Missouri, Arkansas, Illinois, and western Kentucky and Tennessee. Over this region the maximum day temperature ranged from 95° to 106°.

The rainfall of the month was generally in excess of the normal from western Pennsylvania and central Ohio southward on both sides of the eightieth meridian and in Minnesota and the Dakotas. More than twice as many thunderstorms were reported as in the preceding month.

PRESSURE.

The distribution of monthly mean pressure is graphically shown on Chart IV and the numerical values are given in Tables I and VI.

The distribution of mean pressure during June, 1901, was somewhat similar to that of June, 1893, which, it will be remembered, was a month of similar general features. As compared with the previous month pressure rose on both coasts, the maximum increase being about 0.18 inch, and fell in the middle and southern plateaus and quite generally throughout the Plains region and upper Missouri and Mississippi valleys.

Both the Atlantic and Pacific highs seem to have encroached somewhat upon the land, while pressure in the interior of the country, especially in the middle Rocky Mountain region, was considerably below the normal value. A rise in pressure over the oceans and a corresponding fall over the interior of the continents are characteristic of the change from spring to summer. It would seem that when the changes in pressure from May to June are strong and well marked on both coasts there is a pronounced tendency toward strong contrasts of temperature over the interior land areas.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The month was cold and backward in the Northwest, the average daily temperature being as much as 5° to 7° below the seasonal average in Montana and adjacent States. Likewise on the coast of the South Atlantic States the temperature was below the seasonal average, while in the interior of the country, from the Gulf States northeastward to the Great Lakes, the temperature was from 2° to 5° above the seasonal average. The greatest positive departures were in Kansas, Missouri, and southern Iowa. Over a somewhat irregular area extending from eastern Colorado to southern Illinois and western Tennessee, maximum temperatures ranged from 98° to 106°. Maximum temperatures of 100° and over were also registered in portions of the Gulf States, in the interior of Texas, and quite generally in the Southwest. In the Lake region, the upper Mississippi valley, the Middle and South Atlantic States a maximum temperature of 100° was not registered. Minimum temperatures as low as 30° were registered in northern Michigan, northern Minnesota, northern Wisconsin, and in North Dakota, as well as in the higher altitudes of the Rocky Mountains.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	63.6	+ 0.6	− 4.2	− 0.7
Middle Atlantic	12	71.0	+ 0.2	− 5.1	− 0.8
South Atlantic	10	76.6	− 0.7	−11.7	− 2.0
Florida Peninsula	7	79.5	− 0.4	−12.7	− 2.1
East Gulf	7	79.8	+ 0.9	− 9.5	− 1.6
West Gulf	7	80.9	+ 1.8	+ 2.2	+ 0.4
Ohio Valley and Tennessee	12	75.2	+ 1.2	− 8.8	− 1.5
Lower Lake	8	67.6	+ 0.5	− 5.3	− 0.9
Upper Lake	9	63.5	+ 1.2	+ 4.4	+ 0.7
North Dakota	8	62.6	− 1.9	+21.1	+ 3.5
Upper Mississippi Valley	11	74.3	+ 3.1	+ 5.8	+ 1.0
Missouri Valley	10	73.4	+ 2.8	+15.5	+ 2.6
Northern Slope	7	60.4	− 2.6	+12.0	+ 2.0
Middle Slope	6	74.6	+ 3.1	+ 4.5	+ 0.8
Southern Slope	6	77.8	+ 2.0	+ 1.5	+ 0.2
Southern Plateau	15	70.9	− 2.4	+ 1.8	+ 0.3
Middle Plateau	9	61.6	− 2.7	+ 8.0	+ 1.3
Northern Plateau	10	56.7	− 3.9	+ 6.1	+ 1.0
North Pacific	9	55.1	− 3.2	− 5.7	− 1.0
Middle Pacific	5	61.1	− 0.8	− 1.0	− 0.2
South Pacific	4	65.8	− 0.7	+ 3.3	+ 0.6

In Canada.—Prof. R. F. Stupart says:

The mean temperature of June was above the average from Algoma eastward to the Gulf of St. Lawrence and the Atlantic, and below average from the Rainy River district westward to the Pacific; the highest positive departures, amounting to about 6°, occurred near the Georgian Bay, and the largest negative departures from 6° to 9° in southern Alberta and western Assiniboia; in Manitoba the negative departure ranged from 1° to 3°, and in British Columbia from 2° to 6°.

PRECIPITATION.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	2.08	68	+1.0	+1.4
Middle Atlantic	12	2.53	70	−1.1	−2.3
South Atlantic	10	5.64	114	+0.7	+1.4
Florida Peninsula	7	9.36	145	+2.9	+3.9
East Gulf	7	2.82	56	−2.2	−0.9
West Gulf	7	1.26	33	−2.6	−10.2
Ohio Valley and Tennessee	12	3.86	91	−0.4	−6.0
Lower Lake	8	2.92	81	−0.7	−2.0
Upper Lake	9	3.14	84	−0.6	−4.3
North Dakota	8	6.88	177	+3.0	−0.4
Upper Mississippi Valley	11	4.04	87	−0.6	−4.9
Missouri Valley	10	4.19	97	−0.1	−4.2
Northern Slope	7	3.36	126	+0.7	+1.0
Middle Slope	6	2.00	65	−1.1	−2.8
Southern Slope	6	0.76	23	−2.6	−0.4
Southern Plateau	15	0.15	43	−0.2	+1.1
Middle Plateau	9	0.44	81	−0.1	+0.1
Northern Plateau	10	1.09	78	−0.3	−1.4
North Pacific	9	2.17	96	−0.1	+0.9
Middle Pacific	5	0.02	4	−0.5	−0.8
South Pacific	4	T.	0	−0.1	+1.9

There was an abundance of rain in eastern Florida and also in the territory on both sides of the eightieth meridian northward to central Ohio and western Pennsylvania. The rainfall in Maine and also in Minnesota and the Dakotas was from 2 to 6 inches above the seasonal average; elsewhere there was a deficiency of rainfall, amounting in some cases to 4 inches. The region of diminished precipitation coincided fairly well with the region of high temperatures. In general, the area of drought extended from eastern Texas and Louisiana northward to Kansas, southern Iowa and Missouri.

In Canada.—Professor Stupart says:

The rainfall was excessive from Lake Superior to the Pacific and and particularly so in Manitoba and southern Alberta. In British Columbia and the larger part of the Northwest Territories the average was exceeded to a lesser extent. In Ontario there was a fairly pronounced and general deficiency, except in New Ontario and that part of the province lying directly to the eastward of the Georgian Bay. In both the eastern and western portions of Quebec there was a deficiency, but in the middle sections a very pronounced excess, owing mainly to unusually heavy thunderstorms which occurred on the 27th. Along the gulf shores of New Brunswick and Nova Scotia, and also in Prince Edward Island, the rainfall was scant, but westward and southward of this in the Maritime Provinces, it was equal to average or above.

SNOWFALL.

Snow fell during the early part of the month at elevated points throughout the northern Rocky Mountain region, also in North Dakota and in the British Northwest Territories.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 2, 11. Arizona, 14, 21. Arkansas, 6, 8, 11, 13. California, 12, 19. Colorado, 7, 10, 11, 12, 13, 14, 15, 16. District of Columbia, 16. Georgia, 3, 6, 17, 23, 29. Idaho, 2, 3, 4, 7, 10, 19, 25. Illinois, 5, 11, 12, 13, 16, 19, 20, 21, 22, 23, 25, 26, 27, 28. Indiana, 2, 5, 12, 13, 17, 19, 20, 21, 22, 23, 24, 25, 28. Indian Territory, 4, 7, 18. Iowa, 1, 4, 5, 11, 12, 14, 22, 27, 28, 29. Kansas, 3, 7, 8, 12, 14, 17, 18, 21, 22, 27. Kentucky, 2, 5, 12, 17, 23, 25, 28. Louisiana, 4, 7, 8, 29. Maine, 3, 28. Maryland, 13, 22. Massachusetts, 23. Michigan, 2, 12, 13, 24, 25, 27, 28. Minnesota, 4, 5, 6, 11, 12, 14, 15, 17, 18, 24, 25, 27, 28, 30. Mississippi, 1, 11, 17, 24, 25, 27, 28, 29, 30. Missouri, 5, 9, 11, 12, 13, 16, 19, 24, 27, 28. Montana, 3, 9, 11, 18, 19, 20, 23, 25, 28, 29, 30. Nebraska, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 28. Nevada, 10, 12, 13. New Jersey, 2. New Mexico, 1, 21, 27. North Carolina, 17, 22, 23, 24, 25, 28, 29, 30. North Dakota, 3, 6, 9, 17, 23, 24, 25, 27, 28, 29, 30. Ohio, 1, 2, 5, 11, 12, 13, 14, 15, 17, 18, 19, 21, 22, 23, 24, 25, 26. Oklahoma, 3, 4, 7, 12, 18. Oregon, 4, 5, 9, 11, 12, 14, 23. Pennsylvania, 1, 2, 6, 8, 13, 20, 21, 25, 29. South Carolina, 3, 23, 24, 30. South Dakota, 3, 6, 9, 10, 11, 13, 15, 18, 20, 21, 23, 28, 30. Tennessee, 10, 17, 21, 24, 25. Texas, 2, 5, 17. Utah, 2, 3, 13, 14. Vermont, 3. Virginia, 3, 12, 17, 20, 24, 25, 28. Washington, 2, 3, 4, 5, 6, 7, 8, 10, 13, 19, 22, 23, 24, 25, 29. West Virginia, 2, 6, 12, 22, 23. Wisconsin, 4, 5, 11, 12, 16, 17, 24, 25, 27, 29. Wyoming, 7, 9, 10, 11, 13, 20, 30.

SLEET.

The following are the dates on which sleet fell in the respective States:

Oregon, 4. South Dakota, 5, 6.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	4.2	−0.9	Missouri Valley	4.2	−0.6
Middle Atlantic	4.6	−0.4	Northern Slope	5.3	+0.5
South Atlantic	5.1	+0.2	Middle Slope	3.4	−0.3
Florida Peninsula	6.0	+0.5	Southern Slope	2.8	−1.6
East Gulf	4.4	−0.4	Southern Plateau	1.5	−0.4
West Gulf	3.5	−1.1	Middle Plateau	3.2	+0.2
Ohio Valley and Tennessee	4.2	−0.8	Northern Plateau	5.5	+0.4
Lower Lake	4.9	0.0	North Pacific Coast	6.5	+0.4
Upper Lake	5.2	0.0	Middle Pacific Coast	2.6	−0.6
North Dakota	5.7	+0.5	South Pacific Coast	3.0	−0.3
Upper Mississippi	4.3	−0.7			

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	77	− 3	Missouri Valley	63	− 6
Middle Atlantic	72	− 1	Northern Slope	64	+ 8
South Atlantic	80	+ 2	Middle Slope	54	− 5
Florida Peninsula	80	− 1	Southern Slope	50	−10
East Gulf	72	− 3	Southern Plateau	26	− 2
West Gulf	72	− 2	Middle Plateau	36	− 1
Ohio Valley and Tennessee	72	+ 2	Northern Plateau	53	+ 1
Lower Lake	72	0	North Pacific Coast	75	− 4
Upper Lake	76	+ 3	Middle Pacific Coast	56	− 9
North Dakota	74	+ 6	South Pacific Coast	64	0
Upper Mississippi	66	− 5			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	7	55	sw.	Mount Tamalpais, Cal.	4	59	nw.
Do	13	50	sw.	Do	6	59	nw.
Do	14	60	s.	Do	7	70	nw.
Do	18	72	sw.	Do	8	76	nw.
Cape Henry, Va	7	52	nw.	Do	9	75	nw.
Chicago, Ill	5	54	s.	Do	10	67	nw.
Do	29	50	w.	Do	11	56	nw.
Cincinnati, Ohio	23	52	nw.	Do	21	57	nw.
El Paso, Tex	1	65	nw.	Do	22	55	nw.
Fort Smith, Ark	18	50	nw.	Do	23	56	nw.
Hannibal, Mo	10	52	s.	Do	24	60	nw.
Huron, S. Dak	11	50	se.	Do	25	50	nw.
Lexington, Ky	28	57	nw.	Point Reyes Light, Cal.	1	70	nw.
Mount Tamalpais, Cal.	1	78	nw.	Saint Paul, Minn.	28	56	w.
Do	2	57	nw.	Salt Lake City, Utah	6	54	nw.
Do	3	61	nw.	Williston, N. Dak.	24	60	nw.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and

auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 6,670 thunderstorms were received during the current month as against 5,736 in 1900 and 2,479 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 22d, 345; 21st, 335; 5th, 308.

Reports were most numerous from: Ohio, 534; Illinois, 438; Nebraska, 403.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: May 29 to June 6.

In Canada.—Thunderstorms were reported as follows: Halifax, 3d, 14th, 24th; Grand Manan, 14th, 23d, 24th, 27th, 28th; Yarmouth, 3d, 14th, 15th, 23d, 24th, 28th, 29th; Father Point, 3d, 7th, 8th, 14th, 21st, 27th, 30th; Quebec, 7th, 13th, 19th, 20th, 21st, 23d, 25th, 27th, 28th, 29th; Montreal, 3d, 19th, 23d, 28th; Bissett, 1st, 19th, 22d; Ottawa, 1st, 19th, 23d; Kingston, 2d, 18th, 22d, 23d; Toronto, 2d, 6th; White River, 18th, 29th; Port Stanley, 12th, 20th; Saugeen, 22d, 28th; Parry Sound, 1st, 5th, 22d, 28th; Port Arthur, 12th, 17th, 25th, 29th; Winnipeg, 15th, 23d, 26th; Minnedosa, 2d, 3d, 23d, 25th, 26th; Qu'Appelle, 9th, 16th, 22d, 25th, 30th; Medicine Hat, 4th, 7th, 18th, 19th, 23d, 29th; Prince Albert, 21st; Barkersville, 19th; Hamilton, Bermuda, 25th.

Auroras.—One aurora was reported from Quebec on the 14th.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

For description of tables and charts see page 223 of REVIEW for May, 1901.

TABLE 1.—*Climatological data for Weather Bureau Stations, June, 1901.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Mean actual, 8 a. m. + 8 p. m. ÷ 2.	Mean reduced.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							63.6	+ 0.6									77	2.03	— 1.0									4.2	
Eastport	76	69	74	29.86	29.95	+ .02	57.4	+ 2.3	87	30	66	44	16	48	35	53	51	84	5.45	+ 1.9	9	5,903	sw.	36	s.	8	9	9	12	6.0	
Portland, Me	103	81	117	29.82	29.92	— .02	63.8	+ 0.5	94	27	73	45	1	55	30	57	53	71	0.93	— 2.4	7	6,587	s.	31	s.	7	20	6	4	3.8	
Northfield	876	15	65	29.02	29.94	+ .01	63.8	+ 0.2	93	28	76	34	17	51	37	60	57	78	2.97	— 0.6	11	5,580	s.	32	se.	23	10	13	7	5.2	
Boston	125	115	181	29.83	29.96	+ .01	68.2	+ 1.9	97	28	77	49	2	59	26	61	56	68	1.31	— 1.8	8	7,256	sw.	30	ne.	15	16	8	6	4.2	
Nantucket	12	43	85	29.98	29.99	.00	61.8	+ 0.6	78	26	68	48	2	56	20	57	55	83	1.43	— 1.4	8	9,126	sw.	36	ne.	15	11	11	8	5.2	
Block Island	26	11	70	29.96	29.99	+ .01	61.8	— 0.2	86	30	68	47	17	56	22	58	56	84	2.56	0 0	6	9,701	sw.	48	e.	15	19	8	3	2.7	
Narragansett	.....	10	....	.....	.....	.....	64.0	— 0.6	89	30	73	45	17	55	29	....	....	....	1.74	— 0.8	6	.....	sw.	.....	.....	.....	21	4	5	.....	
New Haven	106	117	140	29.87	29.98	.00	67.6	+ 0.3	94	30	77	47	19	58	25	61	56	70	0.25	— 2.7	6	5,585	s.	30	e.	15	22	5	3	2.5	
Mid. Atlan. States.							71.0	+ 0.2									72	2.53	— 1.1									4.6	
Albany	97	84	113	29.86	29.97	+ .03	70.2	+ 1.2	99	28	80	49	9	60	31	62	57	66	3.14	— 0.5	11	5,299	s.	36	se.	29	13	13	4	4.4	
Binghamton	875	79	90	.....	.....	.....	67.9	+ 1.6	93	29	79	42	10	57	37	...	....	....	1.77	— 1.6	11	3,946	w.	24	sw.	30	12	10	8	4.9	
New York	314	108	330	29.66	29.99	+ .01	71.4	+ 2.4	97	30	80	53	1	63	25	62	57	66	0.94	— 2.2	6	7,728	s.	40	nw.	9	18	8	4	3.7	
Harrisburg	374	94	104	.....	.....	.....	71.2	+ 0.7	97	30	81	48	9	62	31	....	....	....	1.13	— 3.1	8	4,002	w.	26	nw.	2	11	11	8	5.1	
Philadelphia	117	168	184	29.89	30.01	+ .02	72.6	+ 0.9	98	30	82	50	1	63	25	64	59	66	1.15	— 2.0	8	6,611	sw.	34	nw.	2	12	10	8	4.8	
Scranton	805	111	119	29.14	29.99	+ .01	68.9	.....	94	29	80	46	1	58	38	61	56	64	1.82	.....	8	4,819	sw.	36	w.	22	10	14	6	5.0	
Atlantic City	52	68	76	29.96	30.01	+ .04	66.4	— 0.4	94	30	73	50	1	60	29	63	61	85	0.98	— 2.2	5	6,979	sw.	24	s.	7	15	12	3	3.9	
Cape May	17	47	51	30.01	30.03	+ .04	67.0	— 1.2	92	30	73	52	1	61	25	62	....	...	2.01	— 1.2	4	5,006	s.	21	nw.	7	13	12	5	4.2	
Baltimore	123	68	82	29.87	29.99	+ .01	72.6	— 0.9	99	30	82	52	1	63	29	66	61	68	0.90	— 3.1	7	3,253	se.	22	n.	22	13	11	6	4.4	
Washington	112	59	76	29.89	30.00	+ .01	72.4	— 0.8	98	30	83	52	1	62	34	66	63	75	4.66	+ 0.7	9	3,890	s.	30	n.	13	18	6	6	3.9	
Cape Henry	.....	5	33	.....	.....	.....	72.6	— 0.5	94	29	80	56	5	65	22	....	....	....	4.94	+ 1.0	8	7,996	s.	52	nw.	7	11	12	7	5.1	
Lynchburg	681	83	88	29.28	29.99	— .01	73.5	— 0.7	96	30	84	54	2	64	31	66	63	75	4.93	+ 1.5	14	2,437	sw.	30	nw.	23	8	13	9	5.5	
Norfolk	91	102	111	29.92	30.02	+ .02	74.6	— 0.5	96	30	83	59	20	66	24	69	66	80	3.77	— 0 5	9	5,974	s.	26	nw.	7	15	10	5	4.4	
Richmond	144	82	90	.....	.....	.....	74.8	... ..	97	30	84	56	1	65	27	....	....	....	2.32	.....	7	3,522	s.	21	w.	3	9	14	7	5.3	
S. Atlantic States.							76.6	— 0.7									80	5.64	+ 0.7									5.1	
Charlotte	773	68	76	29.20	30.00	.00	75.6	— 0.2	94	24	85	58	1	67	24	68	65	77	6.47	+ 1.9	14	3,884	s.	30	n.	30	3	17	10	6.6	
Hatteras	11	17	36	30.02	30.03	+ .03	74.4	+ 0.4	86	25	79	64	8	70	15	70	68	84	4.84	+ 0.3	8	7,957	sw.	38	n.	7	20	8	7	3.5	
Kittyhawk	8	12	30	.....	.....	.....	73.8	— 0.4	90	30	80	60	*	67	18	....	...	....	2.57	— 2.0	5	8,776	se.	...	.....	...	23	3	4	2.9	
Raleigh	376	93	101	29.64	30.03	+ .03	75.0	— 0.7	95	24	84	56	9	66	30	69	66	77	6.04	+ 2.1	12	3,664	sw.	25	w.	24	6	15	9	6.2	
Wilmington	78	82	90	29.94	30.02	+ .02	76.0	— 0.7	93	24	84	61	9	68	27	71	69	84	7.27	+ 1.6	8	5,182	s.	38	nw.	23	9	13	8	5.2	
Charleston	48	14	92	29.98	30.03	+ .02	77.2	— 1.9	96	25	83	63	1	72	20	72	70	83	4.15	— 1.5	13	6,577	s.	43	se.	13	5	19	6	5.5	
Columbia	351	114	122	29.65	30.02	+ .02	78.0	— 1.0	97	25	87	58	1	69	27	70	67	78	4.94	+ 0.8	16	4,682	se.	37	nw.	25	5	19	6	5.6	
Augusta	180	89	103	29.81	30.00	.00	78.4	— 0.4	98	24	87	60	8	70	28	71	68	74	3.71	— 0.9	11	3,825	se.	32	n.	25	9	14	7	5.2	
Savannah	65	79	89	29.95	30.01	.00	78.7	— 0.6	97	25	86	64	1	71	21	73	71	83	6.78	+ 0.2	10	4,841	sw.	30	e.	13	8	18	4	4.7	
Jacksonville	43	69	84	29.96	30.01	+ .01	78.9	— 1.2	94	30	86	65	1	72	21	72	70	79	9.64	+ 4.2	13	5,283	e.	48	se.	1	4	19	7	5.7	
Florida Peninsula.							80.1	— 0.4									80	10.19	+ 4.1									6.0	
Jupiter	28	13	55	29.96	29.98	— .02	79.5	+ 0.5	89	7	85	67	10	74	18	76	74	83	17.41	+10.8	13	6,264	se.	36	e.	12	10	11	9	5.4	
Key West	22	43	50	29.95	29.97	— .02	80.8	— 1.7	88	23	85	69	10	76	16	76	74	79	5.65	+ 1.6	14	5,601	e.	35	ne.	10	4	19	7	5.6	
Tampa	34	60	67	29.94	29.98	— .02	80.1	+ 0.1	94	26	88	66	2	72	22	73	71	79	7.52	— 0.1	18	4,087	ne.	36	s.	3	1	20	9	7.0	
East Gulf States.							79.2	+ 0.2									72	2.82	— 2.2									4.4	
Atlanta	1,174	139	156	28.80	30.00	— .02	76.7	+ 1.0	95	25	86	59	1	67	28	68	64	71	3.10	— 0.8	13	5,012	sw.	37	ne.	25	13	15	2	4.0	
Macon	370	93	99	.....	.....	.....	78.0	.....	97	25	88	58	1	68	30	....	....	....	3.82	.....	13	3,272	s.	36	nw.	6	9	12	9	5.5	
Pensacola	56	78	90	.....	.....	.....	80.0	+ 0.6	97	17	86	68	14	74	21	....	....	....	0.27	— 5.1	4	5,494	ne.	30	ne.	17	15	10	5	4.4	
Mobile	57	88	96	29.92	29.98	— .02	80.0	+ 0.3	99	17	88	65	7	72	27	73	70	77	2.71	— 3.2	8	4,872	n.	36	ne.	27	12	14	4	4.4	
Montgomery	223	100	112	29.76	29.99	— .01	80.2	+ 0.8	98	27	90	63	8	71	27	71	67	69	1.55	— 3.1	8	3,741	se.	28	e.	12	11	12	7	4.8	
Meridian	375	84	93	.....	.....	.....	78.6	+ 1.0	98	26	90	58	2	68	29	....	...	....	2.69	— 2.2	7	2,898	sw.	22	se.	5	15	14	1	3.3	
Vicksburg	247	65	76	29.70	29.95	— .04	80.5	+ 1.3	98	27	91	62	1	70	28	72	68	71	3.73	— 0.6	10	3,647	se.	37	e.	27	11	17	2	3.9	
New Orleans	51	88	121	29.91	29.97	+ .01	81.8	+ 1.5	98	17	90	68	4	74	22	73	70	74	4.46	— 2.2	9	4,779	se.	35	ne.	6	9	16	5	5.0	
Port Eads	.....	27	...	.....	.....	.....	80.6	+ 0.7	95	17	87	66	5	74	17	....	...	....	4.02	— 0.1	8	.....	e.	....	.....	...	0	25	5	.....	
West Gulf States.							80.2	+ 1.2									72	1.26	— 2.0									3.5	
Shreveport	249	77	84	29.69	29.95	— .01	81.8	+ 1.9	100	30	92	61	2	71	28	72	68	68	0.60	— 3.2	5	4,075	se.	38	se.	30	18	5	7	3.3	
Fort Smith	457	79	94	29.44	29.92	.00	79.6	+ 3.5	96	28	91	55	1	68	27	71	67	68	1.44	— 2.9	3	5,304	e.	50	nw.	18	12	17	1	3.6	
Little Rock	357	93	100	29.58	29.95	.00	79.8	+ 2.8	98	27	90	58	1	70	28	71	68	71	1.19	— 3.2	3	4,302	s.	30	nw.	29	21	9	0	2.5	
Corpus Christi	18	42	50	29.90	29.92	— .02	80.9	+ 1.0	96	10	86	67	2	76	20	75	74	81	1.00	— 1.7	7	10,358	se.	45	e.	4	17	9	4	3.2	
Fort Worth	670	106	114	29.19	29.88	— .03	82.0	.....	101	30	93	58	1	71	32	70	64	61	0.33	.....	2	9,070	s.	34	sw.	5	17	11	2	2.9	
Galveston	54	106	112	29.86	29.92	— .03	81.7	+ 0.1	95	17	86	66	2	77	18	75	73	78	0.85	— 4.0	4	7,706	se.	42	se.	4	17	10	3	3.8	
Palestine	510	73	79	29.40	29.93	— .02	79.8	+ 1.6	97	17	89	60	2	70	24	72	69	74	1.96	— 2.3	4	4,451	s.	32	w.	5	14	12	4	4.1	
San Antonio	701	67	77	29.17	29.89	— .02	82.7	+ 2.0	101	18	94	62	5	71	31	72	67	67	1.86	— 0.8	5	5,351	se.	30	w.	4	14	13	3	4.1	
Ohio Val. & Tenn.							75.2	+ 1.2									72	3.36	— 0.4									4.2	
Chattanooga	762	106	112	29.22	30.01	.00	76.8	+ 1.6	98	25	87	54	2	66	28	68	65	72	1.24	— 3.2	9	3,875	sw.	33	se.	24	12	15	3	4.4	
Knoxville	1,004	10	88	28.97	30.00	— .01	74.8	+ 1.2	94	24	85	53	2	65	28	68	65	77	6.44	+ 2.3	15	3,867	sw.	46	nw.	29	15	9	6	4.1	
Memphis	397	140	154	29.56	29.97	+ .01	80.3	+ 2.2	98	27	90	56	1	71	28	70	66	64	1.82	— 2.9	4	5,238	sw.	48	nw.	16	16	12	2	3.7	
Nashville	546	128	134	29.42	29.90	+ .02	78.5	+ 1.9	98	24	89	52	1	68	27	68	63	63	0.48	— 3.8	6	3,934	sw.	36	se.	29	15	11	4	4.0	
Lexington	989	75	102	.....	.....	.....	73.9	+ 0.1	94	25	83	46	8	64	27	....	....	....	3.70	— 0.6	14	5,665	s.	57	nw.	28	13	15	2	3.9	
Louisville	525	114	136	29.42	29.97	.00	76.8	+ 1.7	98	25	87	52	8	67	28	67	63	69	4.12	— 0.2	13	4,719	s.	35	nw.	20	15	7	8	4.2	
Evansville	434	72	82	.....	.....	.....	78.2	.....	99	22	88	53	8	68	27	...	....	....	4.25	.....	12	4,477	s.	23	s.	5	22	6	2	2.4	
Indianapolis	822	154	164	29.10	29.95	— .02	73.6	+ 1.1	95	30	83	45	8	64	26	65	61	67	3.52	— 1.1	11	5,864	nw.	43	se.	19	7	18	5	5.0	
Cincinnati	628	152	157	29.32	29.98	+ .01	75.0	+ 1.2	97	30	84	48	8	66	27	66	63	70	2.27	— 2.1	13	4,265	se.	52	nw.	23	10	13	7	5.3	
Columbus	834	87	100	29.12	29.98	.00	73.4	+ 2.1	99	30	84	44	8	63	31	65	62	75	6.31	+ 2.8	17	4,603	sw.	31	sw.	22	13	8	9	4.6	
Pittsburg	842	116	123	29.09	29.97	— .01	71.8	+ 0.2	94	30	82	45	9	61	31	63	59	70	4.41	+ 0.9	14	3,745	sw.	30	s.	26	16	12	2	3.9	
Parkersburg	638	77	84	29.34	30.01	+ .01	72.7	+ 0.2	95	30	84	48	8	62	33	66	64	78	8.16	+ 4.0	16	3,246	s.	31	n.	11	16	12	2	3.8	
Elkins	1,940	41	50	28.01	30.01	+ .01	67.3	.....	92	30	80	39	10	55	43	61	59	82	5.94	.....	18	2,432	s.	32	s.	13	4	20	6	5.8	
Lower Lake Region.							67.6	+ 0.5									72	2.92	— 0.7									4.9	
Buffalo	767	178	206	29.15	29.96	+ .01	66.0	+ 1.0	87	26	73	44	9	59	27	60	56	72	1.39	— 2.1	9	8,859	sw.	40	w.	7	3	24	3	5.9	
Oswego	335	76	87	29.59	29.95	— .01	64.7	+ 0.7	94	29	74	43	8	56	34	59	55	73	4.28	+ 0.8	8	5,852	w.	29	n.	22	11	11	8	4.9	
Rochester	523	81	90	29.40	29.95	.00	67.6	+ 1.2	95	28	77	42	9	58	35	61	57	71	2.46	— 0.8	8	5,678	sw.	30	sw.	7	14	11	5	4.1	
Erie	713	92	102	29.22	29.96	+ .01	67.0	0.0	88	28	75	43	9	59	28	63	61	81	2.48	— 1.4	9	6,190	w.	28	nw.	7	12	12	6	4.9	
Cleveland	762	190	201	29.17	29.96	— .01	67.8	0.0	92	30	75	42	9	61	27	62	58	72	3.55	— 0.2	13	7,914	se.	40	w.	7	9	10	11	5.3	
Sandusky	629	62	70	29.30	29.96	— .01	68.8	— 0.2	95	30	77	42	8	61	29	63	60	74	3.81	— 0.1	12	4,820	sw.	26	sw.	21	7	13	10	5.3	
Toledo	628	123	127	29.30	29.96	+ .01	70.1	+ 0.3	98	30	79	42	8	61	28	63	58	68	3.32	— 0.1	8	5,980	w.	30	w.	7	16	10	4	4.1	
Detroit	730	160	190	29.18	29.94	— .01	68.8	+ 0.9	90	30	78	42	1	60	26	62	57	68	2.08	— 1.6	8	6,755	sw.	30	w.	7	9	13	8	4.8	
Upper Lake Region.							63.5	+ 1.2									76	3.14	— 0.6									5.2	
Alpena	609	63	80	29.39	29.94	.00	61.0	+ 0.7	95	27	70	38	9	52	31	56	53	76	1.11	— 2.6	12	6,294	se.	35	se.	4	11	8	11	5.2	
Escanaba	612	43	57	29.26	29.91	— .01	61.8	+ 1.3	83	29	70	37	9	53	28	58	55	80	3.17	— 0.7	11	5,420	se.	28	n.	25	7	13	10	5.8	
Grand Haven	632	55	92	29.26	29.93	— .01	65.8	+ 1.4	92	24	74	39	3	57	35	61	58	76	2.16	— 1.7	12	6,970	s.	36	s.	5	12	14	4	4.2	
Houghton	668	66	74	.....	.....	.....	60.8	.....	101	26	71	36	9	51	36	....	....	....	4.32	... ..	16	5,850	e.	36	w.	29	10	13	7	4.9	
Marquette	734	79	116	29.12	29.90	— .04	60.4	+ 1.4	98	26	68	40	8	55	38	57	54	82	3.89	+ 0.4	16	6,233	se.	44	w.	25	7	11	12	5.8	
Port Huron	638	70	120	29.30	29.97	+ .02	66.2	+ 2.1	92	27	76	38	1	56	30	60	56	71	1.26	— 2.2	7	6,340	sw.	28	w.	7	16	13	1	3.8	
Sault Ste. Marie	614	40	61	29.26	29.90	— .03	60.7	+ 0.5	93	27	71	37	9	50	34	56	52	73	3.37	+ 0.3	11	4,887	e.	28	nw.	8	10	14	6	5.0	
Chicago	823	241	274	29.08	29.94	.00	69.1	+ 2.4	97	30	77	43	9	61	31	63	61	78	2.42	— 1.4	11	10,470	s.	54	s.	5	18	10	2	3.7	
Milwaukee	681	124	142	29.22	29.94	— .01	66.4	+ 3.1	94	28	76	43	8	56	39	59	56	72	1.12	— 3.0	11	6,783	ne.	46	sw.	28	8	11	11	5.7	
Green Bay	617	49	57	29.26	29.91	— .04	66.6	— 0.1	96	26	77	39	9	56	31	60	57	72	3.80	+ 0.5	12	5,121	sw.	41	sw.	28	2	16	12	6.7	
Duluth	702	95	115	29.12	29.87	— .05	57.2	— 0.6	86	13	65	40	7	49	36	53	49	77	9.09	+ 4.5	16	6,630	ne.	42	nw.	27	4	15	11	6.2	
North Dakota.							62.2	— 1.7									74	6.70	+ 2.9									5.7	
Moorhead	905	54	60	28.83	29.82	— .05	64.1	— 0.7	90	26	74	32	7	54	33	59	55	76	6.10	+ 1.7	18	7,714	se.	44	ne.	24	10	6	14	6.0	
Bismarck	1,674	16	29	28.07	29.81	— .05	62.8	— 1.0	87	25	73	31	7	53	34	56	52	71	5.17	+ 1.6	14	7,364	nw.	36	n.	24	3	20	7	5.8	
Williston	1,875	15	31	27.87	29.82	— .02	59.8	— 3.5	84	25	70	34	5	49	38	54	50	75	8.84	+ 5.4	20	7,152	w.	60	w.	24	12	12	6	5.2	

TABLE I.—*Climatological data for Weather Bureau Stations, June, 1901*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Elevation of instruments: Thermometers above ground.	Elevation of instruments: Anemometer above ground.	Pressure, in inches: Mean actual, 8 a. m. + 8 p. m. + 2.	Pressure, in inches: Mean reduced.	Pressure, in inches: Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. + mean min. + 2.	Temperature: Departure from normal.	Temperature: Maximum.	Temperature: Date.	Temperature: Mean maximum.	Temperature: Minimum.	Temperature: Date.	Temperature: Mean minimum.	Temperature: Greatest daily range.	Temperature: Mean wet thermometer.	Temperature: Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Precipitation: Departure from normal.	Precipitation: Days with .01 or more.	Wind: Total movement, miles.	Wind: Prevailing direction.	Wind: Maximum velocity: Miles per hour.	Wind: Maximum velocity: Direction.	Wind: Maximum velocity: Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Upper Mis. Valley.							74.3	+ 3.1										66	4.04	− 0.6									4.3	
Minneapolis	.....	99	208	.....	.....	.....	69.0	+ 0.2	95	26	79	37	7	59	31	....	...	....	6.25	+ 2.4	15	8,009	se.	38	se.	9	4	19	7	....	
St. Paul	837	114	124	28.96	29.84	− .08	69.6	+ 2.4	96	25	79	40	7	60	29	61	56	66	7.21	+ 2.9	15	5,617	se.	56	w.	28	6	20	4	5.2	
La Crosse	714	70	78	.....	.....	.....	70.7	+ 1.8	98	26	82	42	7	60	35	....	...	....	5.31	+ 0.8	13	4,713	s.	36	sw.	28	9	18	3	4.5	
Davenport	606	71	79	29.25	29.89	− .05	74.2	+ 3.3	97	30	85	44	9	64	30	65	60	65	3.02	− 1.4	11	5,176	e.	36	sw.	28	17	11	2	3.3	
Des Moines	861	84	88	28.98	29.89	− .02	73.4	+ 3.3	98	28	84	42	7	62	30	65	61	67	2.41	− 3.0	9	6,002	sw.	36	sw.	28	11	16	3	4.5	
Dubuque	698	101	109	29.16	29.89	− .04	72.5	+ 3.0	98	30	83	39	8	62	30	63	58	64	1.23	− 4.0	9	4,999	se.	24	nw.	6	10	18	2	4.1	
Keokuk	614	63	78	29.26	29.90	− .03	76.2	+ 3.7	100	30	86	50	7	66	26	68	64	73	6.34	+ 1.8	11	4,753	sw.	36	se.	5	15	12	3	3.7	
Cairo	356	87	93	29.59	29.96	+ .01	78.6	+ 3.2	98	27	89	55	1	69	26	70	66	70	0.91	− 3.5	4	4,831	sw.	28	nw.	4	9	18	3	4.7	
Springfield, Ill.	644	82	93	29.26	29.93	− .02	75.6	+ 3.4	98	25	86	48	9	65	29	67	63	69	5.34	+ 0.9	15	5,847	sw.	44	nw.	22	10	11	9	5.0	
Hannibal	534	75	110	.....	.....	.....	77.2	+ 4.8	100	30	88	48	7	66	31	....	...	....	2.48	− 1.9	11	6,066	sw.	52	s.	10	14	14	2	4.1	
St. Louis	567	111	210	29.34	29.93	− .01	80.6	+ 5.4	102	29	90	54	8	71	25	68	62	58	3.92	− 1.2	6	6,663	s.	45	w.	5	15	13	2	3.6	
Missouri Valley.							73.4	+ 2.8										63	4.19	− 0.1									4.2	
Columbia	784	4	84	.....	.....	.....	78.4	+ 4.1	104	29	92	48	7	65	35	....	...	....	1.23	− 3.3	7	5,442	s.	30	nw.	22	14	8	8	4.4	
Kansas City	963	78	95	28.89	29.88	− .04	79.2	+ 5.8	100	29	91	54	9	68	42	66	59	57	2.54	− 2.4	5	6,739	s.	33	sw.	22	18	7	5	3.0	
Springfield, Mo	1,334	100	103	28.56	29.91	− .08	77.3	+ 4.9	95	25	88	54	1	67	27	67	61	62	3.89	− 0.9	6	6,827	s.	34	sw.	8	21	9	0	2.5	
Topeka	.....	81	....	.....	.....	.....	78.0	+ 4.8	100	28	90	54	7	66	38	....	...	....	1.90	− 3.6	6	.....	s	....	.....	...	14	15	1	3.5	
Lincoln	1,189	75	84	28.57	29.79	− .11	75.1	+ 4.0	103	28	87	46	7	63	41	64	58	59	1.42	− 3.0	10	8,703	se.	37	e.	12	12	12	6	4.5	
Omaha	1,105	115	121	28.68	29.81	− .09	74.7	+ 3.2	100	28	85	45	7	64	33	65	59	63	5.31	− 0.4	11	5,723	se.	38	n.	21	9	16	5	4.8	
Valentine	2,598	39	40	27.14	29.79	− .11	66.2	− 1.0	97	23	78	39	6	54	37	60	54	69	7.85	+ 4.4	12	7,609	s.	42	w.	5	13	10	7	4.5	
Sioux City	1,135	96	164	.....	.....	.....	71.5	+ 1.2	99	30	82	39	7	61	36	....	...	....	4.70	+ 1.2	15	9,612	s.	48	nw.	21	12	11	7	4.9	
Pierre	1,572	43	50	28.15	29.77	− .09	69.0	+ 0.8	98	23	80	42	7	58	30	59	53	63	4.45	+ 1.0	16	6,450	se.	43	se.	9	10	12	8	5.1	
Huron	1,306	56	67	28.44	29.81	− .09	67.6	+ 0.9	93	25	79	32	7	57	32	61	56	71	6.46	+ 2.9	14	8,174	se.	50	se.	11	8	17	5	4.8	
Yankton	1,233	52	58	.....	.....	.....	70.2	+ 1.6	97	24	81	38	7	60	30	....	...	....	6.84	+ 2.6	15	6,791	w.	44	n.	20	16	10	4	4.1	
Northern Slope.							69.4	− 2.6										64	3.36	+ 0.7									5.3	
Havre	2,505	46	47	27.26	29.87	+ .01	56.0	− 5.3	81	19	66	31	6	46	31	49	44	69	2.75	− 0.3	10	7,042	sw.	34	nw.	16	6	18	6	5.4	
Miles City	2,371	42	50	27.35	29.79	− .06	62.5	− 4.5	90	22	74	38	6	51	34	58	55	79	3.94	+ 0.9	11	4,550	nw.	48	nw.	20	9	14	7	5.1	
Helena	4,110	88	93	25.74	29.91	+ .01	54.0	− 5.4	77	19	63	34	4	45	27	44	36	57	1.83	− 0.6	14	5,801	sw.	36	w.	20	2	14	14	6.8	
Kalispell	2,965	45	51	26.87	29.95	+ .05	51.4	.....	80	18	61	31	8	42	35	45	40	72	2.86	.....	15	4,060	w.	30	sw.	3	6	16	8	5.8	T.
Rapid City	3,234	46	50	26.51	29.78	− .09	61.7	− 2.5	83	25	72	39	6	52	31	55	51	69	7.53	+ 3.6	13	5,537	w.	34	se.	20	12	11	7	4.8	T.
Cheyenne	6,088	56	64	23.95	29.79	− .05	60.0	− 0.9	90	29	74	35	15	46	39	49	41	56	1.94	+ 0.4	12	6,760	nw.	42	nw.	11	12	14	4	4.4	
Lander	5,372	28	36	24.56	29.84	− .01	58.2	− 1.9	86	29	73	32	6	44	42	49	40	58	1.87	+ 0.7	7	3,442	w	35	se.	13	10	13	7	5.1	
North Platte	2,821	43	52	26.95	29.81	− .06	70.2	+ 2.3	99	25	82	36	6	58	41	61	57	53	3.69	+ 0.3	8	6,997	se.	41	w.	14	8	17	5	5.2	
Middle Slope.							74.6	+ 3.1										57	2.00	− 1.1									3.4	
Denver	5,291	79	151	24.64	29.79	− .03	67.5	+ 1.1	98	29	82	43	12	53	41	53	44	52	2.09	+ 0.7	7	5,693	sw.	45	s.	12	15	11	4	3.8	
Pueblo	4,685	80	86	25.17	29.75	− .06	69.6	+ 1.3	103	29	86	44	14	53	44	54	44	49	1.24	0.0	5	4,647	se.	48	nw.	30	22	5	3	3.2	
Concordia	1,398	42	47	28.38	29.82	− .07	76.6	+ 4.3	103	28	89	52	*	64	35	66	61	62	1.23	− 3.2	5	7,015	s.	28	s.	3	11	16	3	4.5	
Dodge	2,509	44	52	27.27	29.78	− .06	76.8	+ 4.2	103	21	91	46	1	63	35	64	57	59	2.63	− 0.7	6	10,820	se.	40	se.	14	21	7	2	3.2	
Wichita	1,358	78	85	28.47	29.85	− .01	78.7	+ 4.8	100	21	90	52	1	67	33	66	59	56	3.16	− 2.1	5	7,663	s.	36	s.	21	20	6	4	2.8	
Oklahoma	1,214	54	62	28.61	29.86	− .03	78.7	+ 2.9	96	30	80	51	1	68	28	67	62	62	1.62	− 1.5	2	9,264	s.	33	s.	4	19	9	2	3.1	
Southern Slope.							77.6	+ 2.2										59	0.46	− 2.8									2.8	
Abilene	1,738	45	54	28.08	29.83	− .06	82.0	+ 3.6	99	20	93	56	1	71	27	66	58	49	T.	− 3.2	0	7,897	se.	31	sw.	4	18	12	0	3.5	
Amarillo	3,676	54	61	26.17	29.81	− .06	73.2	+ 0.8	97	20	86	49	15	60	37	60	53	52	0.92	− 2.3	3	13,831	s.	72	sw.	18	22	8	0	2.1	
Southern Plateau.							75.5	− 1.5										26	0.12	− 0.2									1.5	
El Paso	3,762	10	110	26.06	29.75	− .03	79.5	− 0.7	103	20	94	49	2	64	42	54	32	24	0.39	0.0	3	8,046	w.	65	nw.	1	22	8	0	1.9	
Santa Fe	7,013	47	50	23.25	29.81	− .03	65.7	+ 0.6	89	29	78	38	15	54	31	48	33	34	0.29	− 0.6	7	5,376	sw.	33	s.	26	21	8	1	2.9	
Flagstaff	6,907	12	25	23.32	29.94	. .....	58.3	− 3.9	92	29	76	30	14	40	48	46	...	....	0.02	− 0.4	1	.....	sw.	....	.....	...	17	8	5	...	
Phoenix	1,108	47	57	28.59	29.71	− .06	82.8	− 1.0	112	28	99	59	15	66	42	56	32	19	0.00	− 0.1	0	3,370	e.	16	nw.	14	26	4	0	1.0	
Yuma	141	16	50	29.56	29.70	− .05	83.0	− 1.8	112	28	99	59	14	67	40	62	45	36	0.00	0.0	0	4,751	s.	26	s.	2	30	0	0	0.1	
Independence	3,910	51	58	25.86	29.71	− .07	71.6	− 3.8	101	29	85	44	13	58	32	50	26	19	0.00	0.0	0	7,146	n.	36	nw.	22	24	6	0	1.6	
Middle Plateau.							63.8	− 1.8										36	0.32	− 0.2									3.2	
Carson City	4,730	82	92	25.22	29.90	+ .02	60.0	− 1.2	93	28	75	34	13	45	44	47	37	47	0.23	− 0.2	3	5,119	w.	32	se.	18	20	7	3	2.5	
Winnemucca	4,344	59	70	25.54	29.84	− .02	59.4	− 3.0	90	28	75	31	11	44	47	45	30	37	0.05	− 0.7	3	6,148	ne.	34	nw.	25	14	9	7	4.1	
Modena	5,479	10	38	24.52	29.85	.....	64.0	.....	98	*	81	34	15	47	48	46	27	31	0.32	.....	2	.....	w.	....	.....	...	18	7	5	3.3	
Salt Lake City	4,366	105	110	25.51	29.82	− .04	65.0	− 1.9	90	22	76	40	5	54	36	49	35	36	0.49	− 0.3	2	4,786	nw.	54	nw.	6	23	4	3	2.7	
Grand Junction	4,608	43	50	25.25	29.75	− .09	70.8	− 1.3	102	29	86	46	14	56	41	50	30	29	0.50	+ 0.2	6	4,322	se.	33	sw.	11	19	8	3	3.4	
Northern Plateau.							68.4	− 4.1										53	0.63	− 0.7									5.5	
Baker City	3,471	53	58	26.42	29.98	+ .04	53.4	− 3.3	79	19	64	29	5	43	34	44	35	56	0.96	− 0.6	10	4,204	nw.	24	sw.	17	3	11	16	7.1	0.3
Boise	2,739	61	68	27.10	29.91	+ .02	60.4	− 5.3	91	18	74	30	5	47	36	47	34	44	T.	− 0.8	0	3,401	nw.	26	w.	1	10	13	7	4.8	
Lewiston	770	52	61	.....	.....	.....	62.6	.....	92	18	74	39	8	51	36	....	.....	...	1.35	.....	13	3,472	e.	37	nw.	3	4	18	8	6.0	
Pocatello	4,482	48	56	25.39	29.86	− .02	60.0	− 2.0	87	18	73	35	5	48	38	46	34	43	0.15	− 0.9	4	7,428	w.	40	sw.	18	14	11	5	4.3	
Spokane	1,943	99	107	27.92	29.95	+ .03	56.8	− 5.6	86	18	68	35	4	46	36	48	40	60	1.05	− 0.6	10	4,953	sw.	26	w.	3	5	15	10	6.2	T.
Walla Walla	1,000	65	73	28.92	29.97	+ .04	61.4	− 4.2	90	19	72	40	4	50	36	53	47	64	0.97	− 0.4	12	4,939	s.	25	sw.	3	10	19	1	4.4	
N. Pac. Coast Reg.							65.1	− 3.2										76	2.17	− 0.1									6.5	
Neah Bay	50	7	52	30.01	30.07	+ .05	51.4	− 4.6	67	18	56	41	5	47	17	49	47	87	5.48	+ 0.6	19	5,447	w.	36	w.	3	4	6	20	7.6	
Port Crescent	259	14	20	.....	.....	.....	50.5	− 3.2	79	17	57	36	8	44	35	....	....	...	1.41	− 0.2	12	4,096	w.	22	w.	1	4	14	12	6.3	
Seattle	123	114	121	29.94	30.07	+ .04	57.1	− 2.3	86	18	64	44	5	50	30	50	46	71	1.90	+ 0.3	13	3,961	se.	21	s.	3	5	14	11	6.1	
Tacoma	213	113	120	.....	.....	.....	56.1	− 2.1	88	18	64	42	5	49	33	....	....	....	1.46	− 0.3	11	4,841	sw.	25	sw.	3	4	11	15	7.0	
Astoria	30	87	64	.....	.....	.....	53.9	− 3.7	76	17	59	42	8	48	24	....	....	....	3.14	0.0	17	.....	nw.	....	.....	...	4	6	20	7.5	
Portland, Oreg	154	203	213	29.91	30.07	+ .02	58.0	− 3.6	87	18	65	43	5	51	30	52	48	75	1.39	− 0.5	12	5,464	nw.	28	sw.	1	6	11	13	6.5	
Roseburg	518	56	67	29.50	30.06	+ .01	58.4	− 2.6	87	17	69	40	12	48	35	51	44	66	0.41	− 0.9	5	3,305	nw.	18	w.	11	11	16	3	4.6	
Mid. Pac. C'st Reg.							61.1	− 0.8										56	0.02	− 0.5									2.6	
Eureka	62	60	69	30.01	30.07	+ .04	53.4	− 1.3	63	27	57	42	12	50	17	50	47	82	0.12	− 1.2	1	6,558	nw.	36	nw.	30	16	7	7	4.0	
Mount Tamalpais	2,375	11	18	27.48	29.92	− .03	62.8	. ...	93	28	71	40	10	54	34	48	34	38	0.00	.....	0	15,384	nw.	76	nw.	8	26	4	0	1.1	
Red Bluff	332	50	56	29.50	29.85	− .03	75.6	+ 1.0	108	28	88	48	12	63	36	55	37	30	T.	− 0.5	0	5,492	n.	30	n.	30	27	3	0	1.0	
Sacramento	69	106	117	29.78	29.85	− .04	69.6	+ 1.0	104	28	84	47	10	56	42	57	48	53	T.	− 0.2	0	6,396	sw.	30	nw.	4	20	9	1	3.2	
San Francisco	155	161	167	29.78	29.94	.00	56.7	− 1.7	82	27	64	47	11	49	30	51	48	79	T.	− 0.2	0	10,038	w.	39	w.	6	23	4	3	2.3	
Point Reyes Light	.....	12	16	.....	.....	.....	50.2	− 2.8	73	15	55	43	12	46	28	....	....	....	0.00	− 0.4	0	24,467	nw.	70	nw.	1	17	4	9	3.9	
S. Pac. Coast Reg.							65.6	− 0.7										64	T.	− 0.1									3.0	
Fresno	330	67	70	29.48	29.82	− .04	74.3	+ 0.3	109	29	91	48	9	58	42	55	37	34	T.	− 0.1	0	5,792	nw.	24	nw.	24	28	7	0	1.5	
Los Angeles	338	74	82	29.52	29.88	− .03	65.5	− 0.2	96	27	75	49	11	56	38	57	53	76	T.	− 0.1	0	3,413	w.	14	w.	15	6	21	3	4.2	
San Diego	87	94	102	29.79	29.89	− .03	62.5	− 1.6	86	28	66	53	11	59	24	57	54	76	0.02	0.0	1	4,349	sw.	18	sw.	10	20	5	5	3.6	
San Luis Obispo	301	10	46	29.72	29.94	+ .01	61.0	− 1.4	105	28	75	39	9	47	46	52	47	69	T.	− 0.1	0	3,604	w.	18	w.	24	21	7	2	2.6	
West Indies.																															
Basseterre	29	41	54	29.97	30.00	.....	79.7	.....	86	2	85	71	6	75	13	*75	73	77	7.08	. .....	22	7,445	e.	27	se	4	1	20	9	6.3	
Bridgetown	30	57	65	29.93	29.96	.....	80.2	.....	88	28	86	71	5	75	15	75	73	79	9.34	+ 4.5	27	6,527	e.	25	sw.	30	1	9	20	7.5	
Cienfuegos	52	62	67	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
Grand Turk	11	6	20	.....	.....	.....	84.2	.....	92	*	90	72	15	78	16	....	....	....	0.70	.....	7	... ...	se.	....	.....	...	0	21	9	6.4	
Havana	57	87	105	29.89	29.95	.....	80.0	.....	94	4	86	71	20	74	17	76	74	84	6.55	− 0.6	12	8,190	e.	39	e.	9	7	15	8	5.7	
Kingston	286	38	52	29.63	29.93	.....	79.8	.....	93	30	88	69	16	72	19	73	71	78	12.93	.....	22	4,456	se.	28	se.	8	2	16	13	6.9	
Port of Spain	40	65	66	29.90	29.94	.....	79.7	....	91	28	86	71	23	74	18	74	72	81	6.94	.....	21	2,979	e.	18	ne.	28	2	6	22	8.2	
Puerto Principe	352	55	62	29.63	29.97	.....	80.2	.....	96	1	89	66	22	72	25	74	73	88	14.90	.....	19	5,135	ne.	27	sw.	18	3	11	16	7.3	
Roseau	25	37	47	29.94	29.96	.....	80.7	.....	91	9	87	72	24	75	15	78	70	73	9.47	.....	23	3,443	ne.	23	e.	16	5	10	15	6.9	
San Juan	82	48	90	29.92	30.00	.....	80.2	.....	90	17	86	70	15	75	16	75	73	79	7.05	+ 2.2	21	8,344	e.	30	se.	5	4	10	16	6.6	
Santiago de Cuba	82	26	31	29.86	29.94	.....	81.8	.....	92	30	90	71	17	74	20	75	73	77	6.72	.....	12	2,398	s.	15	sw.	17	9	12	9	5.7	
Santo Domingo	57	37	44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Willemstad	75	39	46	29.81	29.88	.....	83.0	. .....	90	6	87	75	28	79	13	76	74	77	0.21	.....	10	9,998	e.	26	ne.	6	5	19	6	5.4	

NOTE.—The data at stations having no departures are not used in computing the district averages. *More than one date.

TABLE II.—*Climatological record of voluntary and other cooperating observers, June, 1901.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Ashville	100	55	76.8	2.65	
Benton	.....	.....	.....	2.61	
Bermuda	101	58	79.9	1.64	
Birmingham	99	56	80.1	1.91	
Bridgeport	.....	.....	.....	2.08	
Burkville	.....	.....	.....	1.04	
Calera	.....	.....	.....	4.80	
Citronelle	99	63	80.2	2.67	
Clanton	96	51	76.9	0.86	
Daphne	100	64	78.6	2.17	
Decatur	102	51	79.2	2.97	
Demopolis	.....	.....	.....	3.25	
Eufaula[a]	101	57	79.8	2.65	
Eutaw	102	58	80.8	2.00	
Evergreen	99	60	80.0	0.89	
Florence[a]	.....	.....	.....	4.09	
Florence[b]	100	50	78.0	5.15	
Fort Deposit	98	57	78.8	3.67	
Gadsden	99	53	77.8	4.10	
Goodwater	101	54	77.8	4.78	
Greensboro	100	60	81.2	.....	
Greenville	.....	.....	.....	4.02	
Hamilton	100	.....	.....	1.21	
Healing Springs	98	59	78.4	3.56	
Helena	.....	.....	.....	4.80	
Highland Home	96	61	78.2	4.76	
Letohatchee	.....	.....	.....	3.70	
Livingston[a]	103	59	80.6	2.04	
Lock No. 4	99	52	77.6	1.85	
Madison Station	100	51	77.5	4.15	
Maplegrove	102	51	76.6	0.95	
Marion	102	59	80.0	0.46	
Mount Willing	101	60	80.4	3.13	
Newbern	100	60	80.5	2.24	
Newburg	98	.....	.....	4.23	
Notasulga	.....	.....	.....	4.05	
Oneonto	94	49	75.6	3.18	
Opelika	97	54	74.6	4.08	
Oxanna	96	56	76.8	4.73	
Pineapple	101	57	79.4	2.95	
Prattville	99	55	78.0	.....	
Pushmataha	100	57	78.8	5.25	
Riverton	100	48	76.1	1.83	
Scottaboro	98	51	76.3	2.42	
Selma	101	56	80.0	1.70	
Talladega	99	54	78.6	2.57	
Tallassee	.....	.....	.....	2.14	
Thomasville	100	60	80.4	3.25	
Tuscaloosa	101	50	79.0	2.72	
Tuscumbia	98	49	78.9	3.90	
Tuskegee	101	61	79.6	3.28	
Union Springs	101	57	80.0	4.31	
Uniontown	101	61	79.9	2.63	
Valleyhead	98	50	76.6	3.31	
Verbena	.....	.....	.....	1.91	
Wetumpka	101	58	80.0	2.63	
Alaska.					
Killisnoo	65	34	51.4	1.60	
Sitka	61	36	48.6	1.26	
Arizona.					
Allaire Ranch	.....	.....	.....	0.00	
Arizona Canal Co. Dam	112	57	81.7	0.00	
Aztec[*1]	119	71	91.1	0.00	
Benson[*1]	108	63	86.2	0.00	
Bisbee	98	45	73.6	T.	
Bowie[*1]	105	63	88.5	0.00	
Buckeye	110	50	77.2	0.00	
Casagrande[*1]	110	65	84.1	0.00	
Champie Camp	117	51	80.6	0.00	
Cochise[*5]	100	63	82.6	0.00	
Congress	107	57	80.4	0.00	
Dragoon[*1]	101	56	75.8	0.00	
Dudleyville	108	50	77.3	0.00	
Duncan	106	36	71.4	T.	
Fort Apache	100	33	64.2[4]	0.00	
Fort Defiance	98	33	62.4	0.02	T.
Fort Grant	98	49	74.8	0.00	
Fort Huachuca	100	50	77.3	0.00	
Fort Mohave	118	56	85.4	0.00	
Gilabend[*1]	110	69	81.6	0.00	
Globe	108	48	75.8	0.00	
Ingleside	112	54	81.4	T.	
Jerome	103	49	76.0	0.00	
Kingman	107	45	73.1	0.00	
Maricopa[*1]	116	60	83.0	T.	
Mesa	111	51	79.7	T.	
Mohawk Summit[*1]	123	74	91.0	0.00	
Mount Huachuca	101	51	74.4	0.09	
Natural Bridge	.....	.....	.....	0.00	
Nogales	106	40	73.8	0.00	
Oracle	100	52	75.4	0.00	
Oro	.....	.....	.....	0.00	
Parker	122	53	84.1	0.00	
Peoria	116	53	82.8	0.00	
Phoenix	112	50	80.6	0.00	
Pima	108	42	75.4	0.00	
Pinal Ranch	.....	.....	.....	0.00	
Prescott	101	33	64.2	0.00	
San Carlos	112	45	77.2	0.00	
Sentinel[*1]	114	69	85.7	0.00	
Showlow	.....	.....	.....	0.25	
Signal	119	49	80.2	0.00	
Silverking	.....	.....	.....	0.00	
Strawberry	98	33	62.4	0.00	
Supai	110	50	78.8	0.34	
Taylor[b]	99	34	66.1	T.	
Tombstone	102	51	77.4	T.	
Tonto	111	48	77.6	0.00	
Truxton	103	47	73.2	0.00	
Tuba	104	44	72.4	T	
Tucson	108	48	79.4	0.00	
Vail[*5]	105	75	84.4	0.00	
Walnut Grove	.....	.....	.....	0.00	
Willcox[*1]	100	58	72.2	0.00	
Yarnell	.....	.....	.....	T.	
Arkansas.					
Amity	98	51	78.1	2.64	
Arkadelphia	100	54	79.0	1.49	
Arkansas City	.....	.....	.....	1.40	
Batesville	103	51	80.4	0.66	
Beebranch	101	49	79.8	0.85	
Blanchard Springs	101	55	79.4	0.73	
Brinkley	102	48	79.2	0.83	
Camden[a]	.....	.....	.....	2.13	
Camden[b]	98	60	81.0	0.96	
Conway	102	51	80.8	1.01	
Corning	102	54	79.0	1.14	
Dallas	96	54	78.5	1.99	
Dardanelle	.....	.....	.....	1.68	
Elon	97	53	77.8	0.45	
Fayetteville	97	47	77.0	1.89	
Forrest City	99	50	82.6	4.13	
Fulton	.....	.....	.....	1.04	
Hardy	103	50	80.4	0.38	
Helena[a]	.....	.....	.....	0.33	
Helena[b]	99	52	80.0	0.30	
Ione	98	48	77.0	3.34	
Keesees Ferry	102	48	79.2	1.02	
Lacrosse	102	50	80.0	0.37	
Lonoke	102	50	79.4	2.25	
Lutherville	98	53	77.6	2.11	
Malvern	105	51	79.4	1.56	
Marianna	103	49	80.8	2.48	
Marvell	102	50	80.4	0.25	
Mossville	93	51	74.6	2.01	
Mount Nebo	94	60	81.6	1.41	
New Gascony	100	52	80.0	2.15	
Newport[a]	.....	.....	.....	1.52	
Newport[b]	103	50	80.6	1.45	
Newport[c]	101	50	79.4	1.16	
Oregon	102	47	75.4	0.47	
Oseola	100	59	80.8	1.29	
Ozark	100	52	81.2	1.07	
Pinebluff	103	52	81.0	0.99	
Pocahontas	103	46	77.8	0.26	
Pond	97	41	77.0	2.42	
Prescott	101	55	80.0	1.31	
Rosadale	101	54	80.6	1.17	
Russellville	101	51	80.0	2.40	
Silversprings	98	47	77.2	1.53	
Spielerville	101	53	80.4	1.36	
Stuttgart	101	50	79.1	2.03	
Texarkana	103	60	82.7	1.44	
Warren	103	53	77.7	0.33	
Washington	99	56	78.9	1.60	
Wiggs	100	49	78.0	2.14	
Winchester[a]	103	48	78.4	.....	
Winslow	.....	50	.....	3.58	
Witts Springs	100	41	78.0	0.46	
California.					
Angiola	110	40	71.4	0.00	
Bakersfield	112	48	74.8	0.00	
Ballast Point L. H.	.....	.....	.....	0.00	
Bear Valley	.....	.....	.....	0.00	
Berkeley	87	46	61.1	0.00	
Bishop	102	36	67.0	T.	
Boca[*1]	81	39	55.6	0.00	
Bodie	84	16	49.1	0.10	
Bowman	.....	.....	.....	T.	
Branscomb	.....	.....	.....	0.00	
Caliente[*1]	114	55	78.8	0.00	
Campbell	101	36	63.6	0.02	
Cape Mendocino L. H.	.....	.....	.....	0.00	
Cedarville	89	32	58.0	0.17	
Chico[*1]	110	56	77.8	0.00	
Cisco[*1]	81	39	52.0	0.00	
Claremont	102	45	66.4	0.04	
Corning[*5]	108	56	76.8	0.00	
Crescent City	67	36	51.8	0.42	
Crescent City L. H.	.....	.....	.....	0.11	
Cuyamaca[*5]	85	37	57.4	0.00	
Delano[*1]	106	68	77.0	0.00	
Delta[*1]	99	55	73.7	0.00	
Drytown	105	43	70.4	.....	
Dunnigan[*1]	101	61	80.9	0.00	
Durham[*5]	106	50	74.2	0.00	
East Brother L. H.	.....	.....	.....	0.00	
Edmanton[*1]	91	35	58.4	T.	
Elmdale	109	40	70.6	0.00	
Elsinore	112	48	69.5	T.	
Escondido	106	43	69.8	0.00	
Fallbrook	104	47	68.2	0.06	
Folsom City[*1]	108	60	74.6	0.00	
Fordyce Dam	.....	.....	.....	T	
Fort Ross	77	40	54.4	0.00	
Georgetown	98	41	67.4	0.00	
Gilroy (near)	109	37	63.2	0.03	
Goshen[*5]	108	60	81.4	0.00	
Grand Island[*5]	105	50	74.7	0.00	
Greenville	95	27	58.6	T.	
Hanford	108	36	73.0	0.00	
Healdsburg	105	38	68.2	0.00	
Hollister	105	35	62.0	0.00	
Humboldt L. H.	.....	.....	.....	0.05	
Idylwild	.....	.....	.....	0.00	
Indio[*1]	115	69	86.6	0.00	
Iowa Hill[*1]	91	52	67.0	0.00	
Irvine	102	60	73.8	0.05	
Jolon	.....	.....	.....	0.00	
Keene	.....	.....	.....	0.00	
Kennedy Gold Mine	98	40	65.7	T.	
King City	108	42	58.6	0.00	
Laguna Valley	.....	.....	.....	0.00	
Laporte[*1]	84	39	55.2	T.	
Las Fuentes Ranch	.....	.....	.....	0.00	
Legrand	109	42	71.2	0.00	
Lemoncove	111	45	75.2	0.00	
Lemoore[a][*1]	106	52	71.4	0.00	
Lick Observatory	88	33	59.8	0.02	
Lime Point L. H.	.....	.....	.....	0.00	
Lodi	104	46	70.4	T.	
Los Gatos	101	42	64.8	T.	
Mammoth[*1]	115	70	91.6	0.00	
Manzana	107	48	73.8	0.00	
Mare Island L. H.	.....	.....	.....	0.00	
Merced[b]	108	45	72.8	T.	
Mills College	.....	.....	.....	0.00	
Milo	.....	.....	.....	T.	
Milton (near)	105	46	71.1	0.00	
Modesto[*1]	104	56	74.8	0.00	
Mohave[*1]	107	55	76.4	0.00	
Mokelumne Hill[*5]	.....	48	66.8	0.04	
Monterio	100	44	66.4	0.00	
Monterey[*5]	82	50	63.9	0.00	
Morena	98	42	64.8	0.00	
Mount St. Helena	.....	.....	.....	0.00	
Napa	106	39	64.4	0.00	
Needles	113	66	87.0	0.00	
Nevada City	91	38	61.8	0.00	
Newhall[*1]	108	50	68.4	0.00	
Niles[*1]	105	54	66.7	0.00	
North Bloomfield	98	39	65.0	0.00	
North Ontario	97	48	65.2	0.00	
North San Juan[*1]	94	36	61.3	0.00	
Oakland	88	47	63.0	0.00	
Ogilby[*5]	118	80	96.2	0.00	
Oleta[*1]	97	51	66.6	0.00	
Orland[*1]	111	60	83.8	0.00	
Palermo	109	47	72.2	0.00	
Palomar Mountain	.....	.....	.....	0.00	
Paso Robles	110	36	66.8	0.00	
Peachland[*5]	98	50	67.8	T.	
Piedras Blancas L. H.	.....	.....	.....	0.00	
Pigeon Point L. H.	.....	.....	.....	0.00	
Pilot Creek	.....	.....	.....	0.00	
Pine Crest	95	48	62.8	0.08	
Placerville	100	40	65.6	0.00	
Point Ano Nuevo L. H.	.....	.....	.....	0.00	
Point Arena L. H.	.....	.....	.....	0.00	
Point Bonita L. H.	.....	.....	.....	0.00	
Point Conception L. H.	.....	.....	.....	0.00	
Point Fermin L. H.	.....	.....	.....	0.00	
Point George L. H.	.....	.....	.....	0.20	
Point Hueneme L. H.	.....	.....	.....	0.00	
Point Lobos	68	47	54.1	T.	
Point Loma L. H.	.....	.....	.....	0.00	
Point Montara L. H.	.....	.....	.....	0.00	
Point Pinos L. H.	.....	.....	.....	0.08	
Point Sur L. H.	.....	.....	.....	0.00	
Pomona (near)	108	46	71.4	T.	
Poway[*5]	99	50	68.2	0.01	
Quincy	94	33	60.6	T.	
Ranch House	.....	.....	.....	0.05	
Redding	104	50	74.2	T.	
Redlands	107	48	70.0	0.04	
Reedley	109	54	78.4	T.	
Represa	100	50	70.7	0.00	
Riovista	104	49	71.0	0.06	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Riverside	107	48	68.9	0.00	
Roe Island L. H.	.....	.....	.....	0.00	
Rohnerville	.....	.....	.....	0.08	
Rosewood	110	48	75 8	0.00	
Sacramento	100	46	70.0	T.	
Salinas *1	82	50	61.8	0.00	
Salton *1	124	77	94.4	0.00	
San Bernardino	109	42	69.2	0.05	
San Jacinto	109	44	71.2	0.00	
San Jose	.....	.....	.....	T	
San Leandro	94	44	63.4	0.02	
San Luis L. H.	.....	.....	.....	0.00	
San Miguel *1	103	53	70.4	0.00	
San Miguel Island	84	48	58.4	0.00	
Santa Barbara	89	46	61.6	0.10	
Santa Barbara L. H.	.....	.....	.....	0.15	
Santa Clara	.....	.....	.....	T.	
Santa Cruz	99	34	58.9	T.	
Santa Cruz L. H.	.....	.....	.....	0.05	
Santa Maria	92	40	60.4	T.	
Santa Monica	.....	.....	.....	0.00	
Santa Paula	101	48	66.4	0.00	
Santa Rosa *1	99	50	67.4	0.00	
Shasta	105	47	75.2	0.00	
Sierra Madre	99	49	66.2	0.43	
Sonoma	.....	.....	.....	0.00	
S. E Farallone L. H.	.....	.....	.....	0.00	
Stanford University	100	41	62.4	0.00	
Stockton	102	45	68.0	0.00	
Storey	107	43	72.1	0.05	
Summerdale	86	35	57.8	0.04	
Susanville	94	36	62.0	0.27	
Tehama *1	107	61	83.9	0.00	
Tejon Ranch	105	51	75.0	0.00	
Templeton	106	58	70.3	0.00	
Thermalito	108	49	73.8	0.00	
Trinidad L. H.	.....	.....	.....	0.00	
Truckee *1	90	30	54.2	0.00	
Tulare *b*	.....	.....	.....	T.	
Tulare *c*	112	46	74.4	T.	
Ukiah	102	36	64.7	0.00	
Upperlake	102	36	66.4	0.00	
Upper Mattole	.....	.....	.....	0.00	
Vacaville *1	108	57	72.4	0.00	
Ventura	85	48	61.0	0.00	
Visalia *b*	108	41	73.2	0.00	
Volcano Springs	124	75	91.8	0.00	
Wasco	110	48	75.1	0.00	
West Saticoy	.....	.....	.....	0.00	
Wheatland	104	47	71.5	0.00	
Williams *5	105	58	80.2	0.00	
Wilmington *1	80	55	63.3	T.	
Wire Bridge *6	101	54	73.9	0.00	
Yerba Buena L. H.	.....	.....	.....	0.00	
Yreka	90	33	60.5	0.00	
Yuba City *5	103	58	78.3	0.00	
Zenia	.....	.....	.....	0.00	
Colorado.					
Amity	104	41	73.6	1.03	
Arkins	.....	.....	.....	2.22	
Ashcroft	.....	.....	.....	1.31	
Bailey	90	27	55.4	1.72	
Blaine	104	40	73.5	1.76	
Boulder	95	43	66.0	1.76	
Boxelder	.....	.....	.....	1.89	
Breckenridge	80	25	51.4	1.58	3.0
Buenavista	.....	.....	.....	0.12	
Canyon	100	40	67.7	0.91	
Castlerock	94	41	63.8	1.35	T.
Cedaredge	94	35	63.8	0.43	
Cheyenne Wells	103	38	71.7	0.90	
Clearview	86	27	54.3	0.40	
Collbran	95	33	63.2	1.29	
Colorado Springs	92	35	64.2	2.39	
Crook	103	32	69.2	2.41	
Delta	108	35	67.5	0.27	
Dumont	.....	.....	.....	1.15	
Durango	.....	.....	.....	0.35	
Fort Collins	94	38	63.3	2 35	
Fox	.....	.....	.....	3.25	
Gleneyrie	86	41	63.0	2.30	
Glenwood Springs	.....	.....	.....	1.48	
Greeley	98	37	64.8	2.45	
Grover	.....	.....	.....	2.95	
Gunnison	94	26	56.0	0.37	
Hamps	95	33	63.9	0 98	
Hoehne	97	36	68.6	0.56	
Holly	105	43	73.0	1.42	
Holyoke (near)	101	31	68.3	4.58	
Hugo	.....	.....	.....	0.50	
Husted	91	33	61.2	2.34	
Lake Moraine	85	30	51.8	1.75	6.5
Lamar	106	46	75.2	1.16	
Laporte	.....	.....	.....	2.41	
Las Animas	104	45	72.8	0.95	
Lay	93	30	58.1	0.60	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Leroy	99	36	67.4	2.52	
Longs Peak	79	29	51.1	1.47	T.
Mancos	92	30	58.8	0.98	
Marshall Pass	.....	.....	.....	0.70	8.0
Meeker	92	33	58.9	1.44	
Mitchell	.....	.....	.....	0.13	
Montrose	.....	.....	.....	0.55	
Moraine	85	30	54.0	1.52	
Pagoda	93	30	56.2	2.34	
Parachute	102	41	68.4	0.53	
Perrypark	.....	.....	.....	3.70	
Rangely	91	32	60.2	0.41	
Rockyford	105	43	71.9	0.23	
Rogers Mesa	99	38	65.4	0.66	
Ruby	.....	.....	.....	1.00	10.0
Russell	85°	25	53.0	1.00	
Saguache	92	32	58.6	0.90	T.
Salida	95	33	61.0	1.22	
San Luis	92	29	59.2	0.39	T.
Santa Clara	91	31	60.7	0.89	
Sapinero	.....	.....	.....	1.26	
Seibert	.....	.....	.....	3.01	
Silt	95	36	64.5	1.38	
Sugarloaf	88	34	58.1	2.20	
Telluride	91	29	56.9	1.56	6.0
Trinidad	98	40	69.6	0.55	
T. S. Ranch	94	43	66.8	0.48	
Twinlakes	.....	.....	.....	0.63	
Vilas	.....	.....	.....	2.33	
Wagon Wheel	86	30	49.8	0.30	
Walden	85	28	53.8	1.31	0.2
Wallet	.....	.....	.....	2.41	
Westcliffe	89	29	57.4	1.08	T.
Wray	100	41	70.5	3.40	
Yuma	.....	.....	.....	3.51	
Connecticut.					
Bridgeport	97	45	68.6	0.76	
Canton	94	39	65.8	1.24	
Colchester	96	41	66.4	2.33	
Falls Village	.....	.....	.....	1.84	
Hartford *b*	96	46	68.8	0.62	
Hawleyville	91	42	68.0	1.01	
Middletown	95	43	68 0	0.84	
New London	90	49	68.2	1.20	
North Grosvenor Dale	95	39	66.6	1.50	
Norwalk	99	41	69.8	1.29	
Southington	91	44	67.4	0.50	
South Manchester	.....	.....	.....	1.06	
Storrs	92	44	65.4	1.96	
Voluntown	93	40	65.4	2.33	
Wallingford	.....	.....	.....	1.41	
Waterbury	97	42	70.0	0.65	
West Cornwall	93	43	65.7	1.69	
West Simsbury	.....	.....	.....	1.60	
Delaware.					
Milford	101	53	74.0	2.65	
Millsboro	94	50	70.4	2.67	
Newark	97	48	70.2	1.61	
Seaford	100	53	73.7	2.52	
Wyoming	.....	.....	.....	2.13	
District of Columbia.					
Distributing Reservoir *5	94	59	74.4	2.74	
Receiving Reservoir *5	91	58	74.0	2.47	
West Washington	98	50	72.8	4.58	
Florida.					
Archer	97	61	79.0	8.14	
Bartow	95	64	80.2	10.84	
Brooksville	95	64	79.8	10.25	
Carrabelle	92	65	78.8	10.12	
Clermont	96	61	80.2	7.51	
De Funiak Springs	99	61	79.4	2.35	
Deland	93	59	79.2	.....	
Earnestville	.....	.....	.....	10.15	
Eustis	97	63	80.5	5.35	
Federal Point	92	61	77.2	9.77	
Flamingo	88	61	78.8	19.75	
Fort Meade	97	64	80.4	16.27	
Fort Pierce	96	65	78.9	11.64	
Gainesville	94	62	77.4*	8.66	
Huntington	97	62	78.6	7.10	
Hypoluxo	90	69	80.2	21.28	
Inverness	94	62	78.6	10.63	
Jasper	93	60	78.0	6.73	
Kissimmee	93	65	78.7	8.78	
Lake Butler	95	60	78.6	1.78	
Lake City	95	60	78.2	8.36	
McAlpin	99	60	80.7	3.65	
Macclenny	98	58	79.0	8.61	
Manatee	94	63	80.2	15.93	
Marco	96	71	82.4	17.27	
Marianna	96	62	79.1	2.84	
Merritt Island	88	68	79.2	9.89	
Miami	89°	68°	80.4°	21.72	
Micanopy	97	61	79.1	7.16	
Middleburg	96	53	78.2	10.73	
Myers	94	69	78.8	20.22	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
New Smyrna	99	62	77.7	8.92	
Nocatee	97	68	81.4	10.87	
Ocala	97	63	79.1	9.80	
Orange City	97	62	79.8	9.20	
Orlando	93	66	79.6	11.81	
Plant City	96	65	80.0	10.95	
Quincy	99	50	79.8	2.22	
Rockwell	99	63	80.8	9.05	
St. Andrews	99	63	79.0	3.84	
St. Augustine	90	62	78.6	8.27	
Sebastian	90	69	79.3	9.17	
Stephensville *1	98	65	77.8	9.19	
Sumner	95	62	78.9	17.51	
Switzerland	93	62	77.7	8.07	
Tallahassee	94	62	78.6	5.61	
Titusvi le	91	65	78.4	9.97	
Wausau	108	62	80.9	3.05	
Wewahitchka	99	61	81.4	5.61	
Georgia.					
Adairsville	96	54	76.9	1.88	
Albany	102	59	80.6	7.70	
Allapaha	97	60	77.7	7.71	
Americus	101	59	79.6	5.06	
Athens *b*	97	55	76.2	6.53	
Auburn	96	55	76.0	7.07	
Bainbridge	100	61	79.8	3.36	
Blakely	95	60[1]	78.8°	2.41	
Bowersville	97	58	76.6	4.83	
Brent	100	58	77.6	5.23	
Camak	97	57	78.4	6.93	
Canton	.....	.....	.....	3.90	
Carlton	.....	.....	.....	4.63	
Clayton	92	49	72.6	5.64	
Columbus	98°	60°	79.2°	6.16	
Covington	101	56	78.2	4.28	
Dahlonega	96	50	75.2	8.13	
Diamond	94	47	72.6	4.12	
Dublin	.....	.....	.....	7.40	
Eastman	101	61	80.2	5.29	
Elberton	94	57	77.4	4.23	
Experiment	96	59	77.9	5.14	
Fitzgerald	102	57	79.6	4.64	
Fleming	100	59	77.8	8.89	
Fort Gaines	99	61	79.8	3.87	
Franklin	99	52	78.0	3.64	
Gainesville	95	55	74.8	6.89	
Gillsville	99	57	76.4	5.89	
Greenbush	99	49	75.4	2.40	
Griffin	96	52	76.6	3.56	
Harrison	98	56	78.8	6.22	
Hawkinsville	96°	61°	78.9°	3.63	
Jesup	97	58	78.2	6.94	
Lost Mountain	95	59	76.0	3.24	
Louisville	98	59	79.0	6.06	
Lumpkin	101	58	79.8	2.58	
Marshallville	96	59	80.2	6.57	
Mauzy	101	58	79.8	2.19	
Milledgeville	95	59	77.4	5.75	
Millen	102	57	79.4	10.08	
Morgan	97	58	77.9	2.54	
Naylor	98	60	78.8	3.90	
Newnan	101	56	77.6	4.03	
Oakdale	.....	.....	.....	0.99	
Point Peter	100	52	76.9	4.18	
Poulan	96	57	77.6	3.24	
Putnam	97	...	.....	4.83	
Quitman	97	60	78.1	6.53	
Ramsey	94	49	74.7	3.24	
Resaca	.....	.....	.....	5.06	
Rome	99	54	77.4	2.62	
Statesboro	101	60	79.3	8.06	
Stillmore	97	.....	.....	6.90	
Talbotton	98	55	76.7	2.46	
Tallapoosa	95	51	75.7	3.31	
Thomasville	99	61	79.6	7.48	
Toccoa	94	54	74.7	8.01	
Union Point	97	58	76.4	6.41	
Valona	98	59	77.6	7.96	
Vidalia	103	59	79.6	6.87	
Washington	98	59	77.6	8.64	
Waycross	99	60	78.6	9.87	
Waynesboro	95	60	77.0	4.73	
Westpoint	99	58	78.8	5.46	
Woodbury	98	54	77.4	5.38	
Idaho.					
Albion	84	30	54.2	0.48	
American Falls	88	29	57.2	0.28	
Atlanta	85	20	49.8	0.24	
Blackfoot	93	38	61.8	.....	
Burnside	85	22	52.4	1.24	
Chesterfield	85	19	51.8	0.41	
Downey	88	30	58.2	1.40	
Forney	86	17	50.6	2.04	T.
Hagerman	93	35	63.0	0.10	
Hailey	86	23	54.6	0.08	
Idaho City	91[4]	23°	56.5[4]	T.	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Idaho—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lake	76	20	49.5	0.82	
Lakeview	85	33	56.3	3.19	
Lost River	85	24	55.6	0.27	
Moscow	83	32	54.8	2.20	
Murray	80	29	50.8	5.34	1.0
Oakley	.....	24	.....	0.15	
Ola	93	25	59.8	0.68	
Paris	85	29	61.5	0.40	
Payette	94	28	62.6	0.34	
Pollock	89	31	57.7	1.16	
Priest River	84	32	54.2	2.22	0.5
Riddle	86	25	55.6	0.69	T.
St. Maries	88	29	55.5	2.89	T.
Soldier	85	17	52.9	0.18	T.
Swan Valley	89	20	54.6	0.96	
Vernon	.....	.....	.....	1.09	T.
Weston[f]	89	30	58.1	0.45	
Illinois.					
Albion	99	49	77.4	3.84	
Aledo	97	41	73.6	2.28	
Alexander	99	48	75.6	2.23	
Ashton	98	35	71.2	2.02	
Astoria	98	49	74.2	3.86	
Aurora[a]	101	37	72.0	1.81	
Beardstown	.....	.....	.....	3.72	
Bloomington	98	40	74.8	4.79	
Bushnell	102	48	76.2	3.11	
Cambridge	98	42	74.0	2.61	
Carlinville	100	47	77.0	3.65	
Centralia	105	52	80.6	1.46	
Chemung	96	32	69.0	3.56	
Chester	.....	.....	.....	1.72	
Cisne	102	49	76.9	1.81	
Coatsburg	100	49	73.7	6.66	
Cobden	103	49	78.5	2.57	
Decatur	97	46	74.4	5.33	
Dixon	100	38	73.1	2.48	
Dwight	94	37	72.8	3.71	
Effingham	99	50	77.2	3.97	
Equality	104	52	79.0	3.02	
Flora	97	50	76.3	3.91	
Galva	98	39	73.0	3.70	
Grafton	.....	.....	.....	1.52	
Greenville	102	51	77.7	2.21	
Griggsville	101	49	77.2	3.55	
Halfway	102	53	78.5	1.75	
Halliday	101	52	76.8	1.60	
Havana	98	49	75.8	5.02	
Henry	101	39	73.6	2.83	
Hillsboro	101	50	76.8	2.54	
Joliet	98	38	72.2	3.14	
Kishwaukee	100	36	70.6	3.13	
Knoxville	99	38	71.8	3.17	
Lagrange	97	37	69.8	4.38	
Laharpe	100	46	74.0	5.10	
Lanark	100	32	72.0	1.87	
La Salle	99	39	74.6	3.58	
Loami	.....	.....	.....	2.30	
McLeansboro	102	53	79.1	2.39	
Martinton	98	39	71.8	4.76	
Mascoutah	103	50	77.8	3.10	
Mattoon	96	50	75.4	5.93	
Melrose	97	46	75.0	6.41	
Minonk	96	36	72.6	2.50	
Monmouth	100	41	73.3	4.26	
Monticello	95	45	75.1	4.44	
Morgan Park	.....	.....	.....	3.35	
Morrisonville	98	48	75.2	5.53	
Mount Carmel	.....	.....	.....	4.44	
Mount Pulaski	99	45	75.0	7.76	
Mount Vernon	100	52	79.2	2.32	
New Burnside	104	53	77.8	1.34	
Olney	101	52	77.8	2.56	
Ottawa	103	40	75.4	2.67	
Palestine	100	46	75.6	6.42	
Pana	98	48	75.4	3.94	
Paris	97	47	74.6	7.43	
Peoria[a]	.....	.....	.....	4.84	
Peoria[b]	100	46	75.6	4.32	
Philo	97	43	73.4	5.72	
Plumhill	102	50	78.1	2.14	
Rantoul	97	42	73.2	4.83	
Raum	100	52	79.8	0.91	
Riley	99	37	70.6	2.37	
Robinson	98	46	74.8	5.14	
Rockford	100	38	72.6	3.73	
Roundgrove	98	39	70.2	3.82	
St. Charles	99	45	74.8	2.32	
Scales Mound	99	34	71.0	2.17	
Shobonier	103	41	76.1	2.07	
Strawn	98	39	73.5	4.22	
Streator	98	38	72.7	2.85	
Sullivan	98	47	74.4	6.29	
Sycamore	99	37	71.6	1.88	
Tilden	104	51	77.5	1.37	
Tiskilwa	99	38	73.0	2.15	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Tuscola	98	45	74.6	4.97	
Walnut	100	41	74.2	4.16	
Wellington	96	39	73.5	2.92	
Winchester	103	50	77.5	1.91	
Winnebago	99	36	71.3	2.83	
Yorkville	100	35	71.2	1.71	
Zion	98	37	71.6	3.01	
Indiana.					
Anderson	97	39	72.9	3.30	
Angola	94	38	69.2	4.10	
Auburn	97	36	70.8	2.87	
Bedford	100	46	76.2	2.87	
Bloomington	94	43	72.0	4.49	
Bluffton	99	37	71.8	3.39	
Bright	95	42	73.8	4.84	
Butlerville	97	40	73.0	3.13	
Cambridge City	96	36	70.8	4.23	
Columbus	97	40	74.0	3.69	
Connersville	98	40	72.6	4.54	
Crawfordsville	101	43	77.0	6.05	
Delphi	98	39	72.6	4.24	
Edwardsville[e i]	94	51	76.3	3.94	
Farmland	95	38	71.2	4.18	
Franklin[e i]	95	52	73.7	4.96	
Greencastle	92	43	72.8	7.96	
Greensburg	96	.....	.....	1.14	
Hammond	98	39	71.0	3.24	
Hector	98	39	72.1	3.75	
Huntington	97	41	73.5	8.05	
Jeffersonville	97	49	75.6	4.90	
Knightstown	99	39	73.8	4.95	
Kokomo	96	42	73.5	5.09	
Lafayette	95	39	72.9	4.46	
Laporte	103	40	72.4	2.49	
Logansport	99	40	72.8	2.99	
Madison[a]	97	45	74.5	4.01	
Madison[b]	.....	.....	.....	4.40	
Marengo	98	43	74.2	4.76	
Marion	93	37	73.0	4.39	
Markle	92	39	70.2	3.90	
Mauzy	97	38	72.4	3.32	
Mount Vernon	102	51	77.8	3.71	
Northfield	97	37	72.0	4.80	
Paoli	99	42	74.9	3.67	
Princeton	102	48	76.8	3.10	
Richmond	96	37	71.8	4.03	
Rockville	93	43	71.6	7.92	
Salem	98	42	75.0	8.14	
Scottsburg	98	46	74.0	5.57	
Seymour	97	52	75.2	3.63	
Shelbyville	.....	.....	.....	4.08	
South Bend	96	39	71.0	3.01	
Syracuse	99	36	71.3	2.16	
Terre Haute	98	48	77.2	6.51	
Topeka	94	38	69.6	1.61	
Valparaiso	97	39	72.6	2.42	
Veedersburg	95	40	72.6	7.98	
Vevay	97	47	74.6	6.30	
Vincennes	101	50	78.3	6.20	
Washington	101	46	76.0	5.15	
Winamac	95	39	72.2	2.41	
Worthington	97	44	74.6	4.13	
Indian Territory.					
Bengal	98	50	77.5	2.40	
Chickasha	100	56	81.0	0.78	
Claremore	99[h]	57[h]	81.5[h]	3.00	
Healdton	100	50	79.8	1.83	
Holdenville	93	53	77.0	3.83	
Lehigh	101	52	76.6[e]	0.92	
Marlow	98	59	79.1	1.50	
Muscogee	98	52	78.2	2.51	
Pauls Valley	98	50	78.1	1.54	
Ryan	102	55	81.6	0.50	
Sapulpa	98	50	79.5	2.30	
South McAlester	.....	.....	.....	2.75	
Tahlequah	99	47	77.8	2.40	
Tulsa	.....	.....	.....	4.55	
Wagoner	103	48	82.1	2.02	
Webbers Falls	99	52	80.4	2.58	
Iowa.					
Afton	98	40	73.4	5.05	
Albia	100	42	73.2	2.47	
Algona	96	36	71.4	3.82	
Alta	97	34	69.4	3.20	
Amana	99	42	73.2	4.36	
Ames[b]	99	39	74.4	2.36	
Atlantic	99	37	72.4	6.70	
Battle Creek	.....	.....	.....	3.26	
Baxter	95	38	71.8	4.53	
Belknap	98	46	74.6	2.43	
Belleplaine	97[e]	40[e]	72.5[e]	3.04	
Bonaparte	103	44	74.8	2.26	
Britt	95	33	70.3	3.45	
Buckingham	.....	.....	.....	2.99	
Burlington	98	48	75.4	4.95	
Bussey	.....	.....	.....	3.10	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Carroll	97	35	71.1	4.41	
Cedar Rapids	103	42	74.2	3.86	
Centerville	.....	.....	.....	1.56	
Chariton	96	43	73.2	5.18	
Charles City	99	34	70.3	2.69	
Clarinda	102	44	74.0	5.94	
Clearlake	98	35	72.0	2.15	
Clinton	102	39	73.3	3.17	
College Springs	100	44	74.8	4.88	
Columbus Junction	104	45	75.6	1.05	
Corning	98	43	72.6	5.34	
Council Bluffs	103	44	74.9	4.75	
Cresco	99	34	69.1	1.52	
Cumberland	.....	.....	.....	5.14	
Danville	.....	.....	.....	1.61	
Decorah	101	32	71.2	2.99	
Delaware	97	35	71.3	2.72	
Denison	97	36	72.2	4.11	
Desoto	100	43	75.5	3.42	
Dows	97	35	70.4	2.28	
Eldon	102	40	75.2	3.15	
Elkader	102	34	73.0	1.56	
Emerson	.....	.....	.....	4.42	
Estherville	95	35	69.4	3.22	
Fayette	98[e]	32[b]	70.6[e]	3.59	
Fonda	.....	.....	.....	4.16	
Forest City	93	34	69.3	3.43	
Fort Dodge	96	36	70.7	2.95	
Fort Madison	.....	.....	.....	4.91	
Galva	99	40[e]	72.2[e]	2.35	
Gilman	.....	.....	.....	4.88	
Glenwood	100	43	74.6	4.66	
Grand Meadow	96	37	69.8	3.01	
Greene	101	35	72.0	2.22	
Greenfield	97	38	72.8	5.71	
Grinnell (near)	99	40	72.9	4.72	
Grundy Center	94	37	70.7	5.12	
Guthrie Center	96	46	75.9	4.74	
Hampton	99	37	72.2	2.46	
Harlan	100	37	73.2	7.29	
Hawkeye	.....	.....	.....	2.64	
Hopeville	96	44	72.1	4.85	
Hoprig	.....	.....	.....	1.81	
Humboldt	97	37	72.0	3.69	
Independence	100	36	70.7	2.81	
Indianola	96[e]	42	73.2	.....	
Iowa City	102	43	73.8	3.33	
Iowa Falls	96	36	70.6	5.24	
Jefferson	.....	.....	.....	4.37	
Keosauqua	101	47	76.3	2.31	
Knoxville	97	43	74.0	4.92	
Lacona	.....	.....	.....	5.45	
Lansing	101	38	71.8	2.63	
Larrabee	98	30	68.8	3.78	
Leclaire	.....	.....	.....	2.61	
Lemars	97	35	70.4	3.26	
Lenox	94	43	71.5	4.96	
Logan	98	36	71.9	7.97	
Maple Valley	.....	.....	.....	3.51	
Maquoketa	98	39	71.8	3.11	
Marshalltown	99	39	73.0	2.80	
Monticello	100	37	70.6	3.56	
Mooar	99	.....	.....	5.00	
Mountayr	96	42	72.8	4.59	
Mount Pleasant	100	42	73.4	2.01	
Mount Vernon[b]	98	42	74.4	4.25	
Murray	.....	.....	.....	4.80	
New Hampton	96	36	69.0	2.70	
Newton	98	41	72.8	3.58	
Northwood	93	35	68.8	2.46	
Odebolt	100	35	72.8	3.72	
Ogden	97	35	70.7	2.76	
Olin	98	32	72.8	5.09	
Onawa	96	39	72.0	5.67	
Osage	95	34	68.7	1.58	
Osceola	97	42	73.0	4.81	
Oskaloosa	99	43	73.4	3.60	
Ottumwa	101	.....	.....	2.04	
Ovid	97	42[b]	73.4	5.01	
Pacific Junction	100	44	73.4	3.75	
Pella	98	42	74.4	4.56	
Perry	100	39	72.9	2.63	
Plover	98	32	70.2	3.67	
Primghar	94	.....	.....	7.46	
Redoak	96	47	73.9	4.33	
Ridgeway	101	38	72.1	2.71	
Rockwell City	97	36	68.4	5.47	
Ruthven	.....	32	.....	7.34	
Sac City	98	36	71.1	2.05	
St. Charles	97	47	73.6	4.36	
Scranton	97	37	73.7	4.03	
Sheldon	96[e]	33	68.7	4.93	
Sibley	96	32	68.4	4.79	
Sigourney	104	42	76.0	2.39	
Sioux Center	97	33	69.8	5.40	
Spirit Lake	94	33	69.2	4.28	

TABLE II.—*Climatological record of voluntary and other cooperating observers.*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean	Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Storm Lake	95	36	70.0	2.87	
Stuart	98	38	72.4	4.34	
Thurman	100	45	74.0	4.81	
Toledo	98	38	73.2	4.04	
Villisca	98	42	74.0	5.70	
Vinton *1	97[b]	44[c]	72.3[b]	3.20	
Wapello	106	46	75.8	1.46	
Washington	100	40	73.2	1.61	
Washta	.....	.....	...	2.82	
Waterloo	98	38	71.8	3.48	
Waverly	97	39	71.0	1.87	
Westbend	96	35	70.0	3.07	
West Union	....	.....	.....	4.24	
Wilton Junction	101	41	74.9	2.04	
Winterset	98	41	73.8	4.83	
Woodburn	.....	.....	.....	4.44	
Kansas.					
Abilene	105	50	78.8	3.62	
Achilles	105	37	72.6	1.73	
Altoona	100	48	78.0	1.53	
Anthony	.....	.....	....	3.15	
Atchison *a*	102	45	75.2	1.05	
Baker	103	48	74.7	1.60	
Beloit	107	42	76.2	1.16	
Burlington	100	48	77.4	3.11	
Chanute	98	51	78.8	4.08	
Colby	106	37	73.8	1.74	
Columbus	98	52	78.0	4.34	
Coolidge	106	41	75.0	1.37	
Delphos	103	50	77.0	3.31	
Dresden	105	41	72.7	0.89	
Ellinwood	101	47	77.1	2.30	
Emporia	99	53	78.8	4.30	
Englewood	105	47	79.8	0.30	
Eureka Ranch	106	41	76.6	1.57	
Fallriver	99	47	78.0	2.31	
Fanning	101	40	75.2	1.87	
Farnsworth *1	104	51	77.5	1.25	
Fort Leavenworth	101[f]	54[f]	79.0[f]	0.75	
Fort Scott	104	51	80.4	0.53	
Frankfort	105	42	76.8	4.82	
Garden City	107	43	78.7	1.39	
Gove *1	106	44	74.2	1.52	
Grenola	99	49	76.4	1.95	
Hanover	105	.....	.....	3.87	
Harrison	105	46	76.4	2.42	
Hays	108	45	76.6	1.53	
Horton	104	51	77.5	1.21	
Hoxie	106	42	75.3	1.97	
Hutchinson	103	46	76.4	4.00	
Independence	102	52	80.1	1.91	
Jetmore	105	45	77.4	0.58	
Lakin	100	45	76.0	1.45	
Lawrence	99	55[c]	78.2	1.80	
Lebanon	105	41	75.7	1.47	
Lebo	100	52	78.3	3.07	
Leoti	107	41	73.7	1.55	
Little River	103	50	78.3	2.55	
Macksville	102	43	75.8	3.50	
McPherson	104	49	78.0	3.04	
Madison	98	48	77.1	4.09	
Manhattan *c*	103	48	78.8	2.28	
Marion	93[b]	49[c]	78.3[b]	6.50	
Medicine Lodge	104	49	80.2	1.20	
Minneapolis	103	46	76.6	3.05	
Moran	98	51	77.9	1.36	
Mounthope *1	100	63	80.4	1.33	
Ness City	107	47	80.0	1.39	
Newton	99	46	77.2	4.04	
Norwich	100	48	78.0	3.19	
Olathe	101	52	79.2	0.36	
Osage City	101	53	81.9	2.48	
Osborne	.....	.....	.....	0.88	
Oswego	98	51	78.4	1.54	
Ottawa	102[f]	47	78.8[c]	1.99	
Phillipsburg	110	48	78.4	3.05	
Pratt	104	46	78.0	3.05	
Rome	103	43	78.4	2.50	
Russell	104	44	76.6	1.10	
Salina	101	45	76.2	6.34	
Sedan	98	47	76.8	3.39	
Seneca	107	47	75.9	3.91	
Toronto	101	48	77.5	2.80	
Ulysses	106	43	78.0	1.62	
Valley Falls	103	48	78.0	1.39	
Viroqua	101	45	75.6	2.10	
Wakeeney (near) *1	100	60	76.4	1.70	
Wallace	.....	.....	.....	2.01	
Wamego *1	102	56	78.2	2.35	
Winfield	101	49	78.9	1.94	
Yates Center	99	45	77.2	2.75	
Kentucky.					
Alpha	95	48	74.8	2.78	
Anchorage	96	43	74.6	6.35	
Bardstown	100	47	76.4	2.81	
Berea	96	45	74.2	4.64	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Kentucky—Cont'd.	°	°	°	*Ins.*	*Ins.*
Blandville	101	53	79.0	1.56	
Bowling Green	104	47	78.6	2.71	
Burnside	.....	.....	.....	4.67	
Catlettsburg	96	48	73.6	5.17	
Centertown	100	46	77.8	2.75	
Earlington	100	55	78.8	2.62	
Edmonton	98	44	75.8	4.57	
Eubank	95	42	73.1	4.73	
Falmouth	.....	.....	....	3.68	
Fords Ferry	97	45	75.5	4.67	
Frankfort	97	48	74.8	3.81	
Franklin	97	55	77.2	0.72	
Georgetown	96	48	75.0	.....	
Greensburg	99	42	75.6	4.19	
Henderson	98	54	78.1	4.95	
Hopkinsville	101	45	78.4	2.91	
Irvington	93	48	74.9	5.57	
Leitchfield	96	47	74.8	2.65	
Loretto	95	42	74.0	4.54	
Manchester	100	45	76.6	6.80	
Marrowbone	97	.....	.....	1.95	
Maysville	101	44	75.0	5.98	
Mount Sterling	95[c]	46	73.0	5.91	
Owensboro	97	51	76.5	2.38	
Owenton	93	46	72.8	5.31	
Paducah *a*	.....	.....	.....	1.40	
Paducah *b*	102	53	81.1	1.54	
Richmond	96	45	74.6	3.75	
St. John	93	47	73.6	3.98	
Scott	96	44	73.7	6.57	
Shelby City	96	43	73.0	4.20	
Shelbyville	101	46	76.5	5.55	
Vanceburg	95	42	71.2	5.50	
Warfield	93	45	72.8	5.60	
Williamsburg	96	48	73.1	5.39	
Louisiana.					
Abbeville	94	66	80.0	4.05	
Alexandria	106	57	83.0	2.43	
Amite	102	62	81.5	3.01	
Baton Rouge	100	62	81.2	6.55	
Burnside	58[b]	62[d]	79.8[c]	4.08	
Calhoun	100	55	79.4	1.31	
Cheneyville	103	57	81.5	3.00	
Clinton	.....	.....	.....	2.63	
Covington	96	63	80.2	4.73	
Donaldsonville	102	67	82.0	3.09	
Emille	98	66	80.4	4.86	
Farmerville	100	61	82.0	0.78	
Franklin	99	64	80.9	4.30	
Grand Coteau	98	62	81.0	3.13	
Hammond	101	63	81.8	1.71	
Houma	99	61	81.6	3.96	
Jeanerette	100	66	82.2	5.39	
Jennings	101	60	81.2	2.41	
Lafayette	102	60	81.6	5.36	
Lake Charles	101	62	81.3	2.15	
Lake Providence	98	58	79.8	2.54	
L'Argent	99	60	80.0	3.40	
Lawrence	99	66	81.5	6.89	
Libertyhill	105	60	82.0	1.02	
Mansfield	101	53	80.0	1.19	
Melville	99	59	79.8	2.20	
Minden	104	56	81.8	0.75	
Monroe	101	61	81.9	0.56	
New Iberia	99	62	81.2	3.05	
Oakridge	106[c]	56[b]	81.3[c]	0.80	
Opelousas	100	60	81.8	4.90	
Oxford	99	54	79.0	2.93	
Paincourtville	100	65	81.6	7.74	
Plain Dealing	102	54	79.2	0.27	
Prevost	.....	.....	.....	0.98	
Rayne	104	59	82.8	1.97	
Reserve	103[d]	63[d]	82.9[d]	2.62	
Robeline	103	55	80.6	1.47	
Ruddock	98	68	80.6	1.87	
Ruston	103	56	80.9	0.25	
Schriever	101	61	81.0	3.36	
Southern University	92[c]	60[c]	76.5[c]	2.25	
Sugar Ex. Station	98	66	81.6	3.07	
Venice	96	62	78.2	6.05	
Wallace	102	66	81.7	4.61	
White Sulphur Springs	103	60	83.8	0.31	
Maine.					
Bar Harbor	91	38	60.4	3.23	
Belfast	95	41	63.2	0.88	
Bemis	92[c]	31[c]	61.2[c]	1.66	
Calais	96	38	64.4	3.55	
Carmel	91	40	64.2	1.95	
Cornish	97	42	66.5	1.79	
Fairfield	95	40	65.6	1.64	
Farmington	94	36	64.6	3.47	
Flagstaff	91	32	61.6	4.58	
Gardiner	98	43	66.6	1.36	
Kineo	88	41	60.9	....	
Lewiston	98	45	66.9	1.12	
Mayfield	91	39	63.2	2.94	

Stations	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Maine—Cont'd.	°	°	°	*Ins.*	*Ins.*
North Bridgton	98	40	66.2	3.91	
Orono	91	38	65.6	1.79	
Rumford Falls	95	41	65.6	3.84	
Winslow	95	36	65.6	2.51	
Maryland.					
Annapolis	96	52	74.5	1.85	
Bachmans Valley	96	41	69.7	5.10	
Boettcherville	99	40	70.4	3.26	
Boonsboro *a*	96	44	71.7	3.16	
Cambridge	96	52	74.2	....	
Chase	96	41	69.8	0.83	
Cheltenham	97	48	71.4	3.32	
Chewsville	97	40	70.4	4.43	
Clearspring	92	40	69.2	3.93	
Coleman	.....	.....	.....	1.47	
Collegepark	99[c]	47[f]	69.3[c]	6.72	
Cumberland *b*	.....	.....	.....	2.89	
Darlington	100	48	71.1	1.31	
Deerpark	89	32	64.4	3.88	
Denton	100	50	72.7	1.85	
Easton	94	50	68.8	2.96	
Fallston	97	45	70.1	1.76	
Frederick	98	47	72.6	6.04	
Frostburg	91	38	66.3	6.02	
Grantsville	89	35	65.4	2.79	
Greatfalls	97	49	72.5	2.47	
Greenspring Furnace	95	42[f]	72.5[c]	3.15	
Hagerstown	99	40	72.6	3.89	
Hancock	102	40	71.2	3.94	
Harney	.....	.....	.....	2.69	
Jewell	95	51	71.6	4.17	
Johns Hopkins Hospital	99	41	71.0	0.70	
Laurel	99	43	71.4	3.17	
Longwoods	.....	.....	.....	3.88	
McDonogh	98	46	70.8	2.33	
Mount St. Marys Coll	92	49	69.6	3.20	
Newmarket	95	42	71.2	4.68	
Pocomoke	96	54	72.7	4.58	
Prince Fredericktown	96[f]	50	72.0	2.00	
Princess Anne	94	51	70.8	3.80	
Queenstown	97	54	74.6	3.24	
Rockhall *b*	97	48	71.5	1.43	
Sharpsburg	102	47	75.2	1.86	
Smithsburg *a*	96	41	70.4	3.46	
Smithsburg *b*	96	43	71.2	3.32	
Solomons	94	56	72.8	2.75	
Sudlersville	102	47	72.6	1.30	
Sunnyside	90	33	64.3	5.72	
Takoma Park	93	48	70.4	5.85	
Taneytown	95	45	71.4	2.73	
Van Bibber	97	50	71.3	1.28	
Westernport	95	39	68.4	3.90	
Westminster	95	44	69.5	2.47	
Woodstock	98	47	72.8	1.60	
Massachusetts.					
Amherst	95	42	66.9	0.75	
Bedford	92	43	66.3	1.49	
Bluehill (summit)	94	45	66.6	1.65	
Cambridge	98	44	68.0	1.09	
Chestnuthill	99	42	68.2	1.33	
Cohasset	.....	.....	.....	2.01	
Concord	97	41	67.0	1.81	
East Templeton *1	96	47	67.6	1.05	
Fallriver	91	48	66.3	1.77	
Fitchburg *a* *1	96	47	69.0	1.19	
Fitchburg *b*	98	43	68.2	1.10	
Framingham	98	44	68.9	1.20	
Groton	95	39	66.8	2.02	
Hyannis	.....	.....	.....	1.27	
Jefferson	.....	.....	.....	2.25	
Lawrence	97	43	68.6	1.46	
Leominster	.....	.....	.....	2.08	
Lowell *a*	96	45	69.6	1.49	
Lowell *b*	98	42	68.5	.....	
Ludlow Center	92	36	62.0	1.23	
Middleboro	90	39	65.0	1.88	
Monson	94	44	67.8	1.26	
New Bedford *a*	89	48	65.2	1.79	
Pittsfield	96	42	67.0	1.38	
Plymouth *1	91	53	67.6	1.56	
Princeton	.....	.....	.....	1.03	
Provincetown	93	44	66.2	1.79	
Somerset *1	97	49	70.3	1.71	
Springfield Armory	96	45	68.6	1.23	
Sterling	.....	.....	.....	1.65	
Taunton	91	38	62.1	2.27	
Webster	.....	.....	.....	1.28	
Westboro	96	41	68.4	2.17	
Weston	94	42	67.2	1.12	
Williamstown	90	44	66.0	1.80	
Winchendon	.....	.....	.....	1.61	
Worcester	96	47	68.8	0.93	
Michigan.					
Adrian	94	37	69.2	2.23	
Agricultural College	94	35	68.0	3.37	
Allegan	95[c]	34[c]	69.8[c]	1.71	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Alma	98	34	68.2	1.77	
Ann Arbor	95	37	69.0	2.01	
Annpere	94	38	68.1	0.70	
Arbela	94	34	68.0	1.58	
Baldwin	99	30	69.0	1.75	
Ball Mountain	94	31	67.1	2.09	
Battlecreek	94	38	69.4	4.34	
Bay City	.....	35	.....	0.85	
Benzonia	94	30	66.0	1.39	
Berlin	98	36	66.7	3.48	
Berrien Springs	97	36	70.6	2.62	
Big Rapids	96	28	66.1	1.38	
Birmingham	93	36	67.8	2.70	
Boon	97	25	63.4	2.44	
Calumet	92	35	60.4	6.93	
Carsonville	94	33	63.0	.....	
Cassopolis	96	37	69.6	2.81	
Charlevoix	96	36	64.4	1.34	
Chatham	95	25	61.0	4.00	
Cheboygan	95	33	63.8	4.45	
Clinton	93	35	69.0	2.79	
Coldwater	93	30	69.6	4.96	
Deerpark	95	34	56.9	3.47	
Detour	91	39	60.2	3.50	
Dundee	91	40	69.4	1.48	
Eagle Harbor	95	33	57.4	5.07	
East Tawas	96	31	64.6	.....	
Eloise	94	39	68.2	1.79	
Ewen	95	3	66.7	.....	
Fairview	91	39	66.0	1.73	
Fennville	97	36	68.9	4.00	
Fitchburg	91	35	67.2	4.05	
Flint	94	36	67.4	3.04	
Gaylord	100	30	64.4	1.70	
Gladwin	95	34	66.4	1.60	
Grand Marais	94	30	60.2	3.72	T.
Grand Rapids	96	39	70.8	4.94	
Grape	94	37	68.4	1.45	
Grayling	100	32	65.4	1.15	
Hanover	93	36	68.6	3.88	
Harbor Beach	98	35	65.0	0.63	
Harrison	97	34	67.8	0.89	
Harrisville	93	38	61.8	1.62	
Hart	97	34	67.3	2.98	
Hastings	98	34	69.0	2.30	
Hayes	94	33	65.8	0.76	
Highland Station	.....	.....	.....	3.05	
Hillsdale	94	35	68.2	3.55	
Humboldt	96	25	62.2	3.56	
Ionia	97	33	68.4	3.30	
Iron River	95	30	63.2	5.27	
Ishpeming	95	30	63.4	2.56	
Ivan	100	28	65.0	1.89	
Jackson	95	38	70.6	3.22	
Jeddo	97	36	66.8	0.82	
Kalamazoo	95	39	72.1	2.16	
Lake City	99	30	64.6	T.	
Lansing	93	37	68.8	3.75	
Lapeer	94	36	67.3	2.20	
Lathrop	96	27	66.5	3.76	
Lincoln	95	36	63.3	1.13	
Mackinac Island	83	35	59.4	4.28	
Mackinaw	89	47	66.0	3.42	
Madison	94	38	70.4	2.22	
Mancelona	101	30	66.7	1.80	
Manistee	93	31	65.6	1.78	
Manistique	82	30	59.8	3.43	
Menominee	94	38	63.0	2.26	
Midland	97	36	69.6	1.28	
Milo	99	31	65.4	0.53	
Mount Clemens	98°	38°	67.8°	1.60	
Mount Pleasant	97	35	67.9	1.99	
Muskegon	94	39	67.8	4.03	
Newberry	91	30	64.8	1.63	
North Marshall	98	36	68.6	3.20	
Old Mission	99	36	66.5	1.50	
Olivet	91	39	68.8	1.86	
Omer	96	29	63.3	0.61	
Onaway	99	34	65.1	3.45	
Ontonagon	99	34	55.8	4.61	
Ovid	94	36	68.0	2.50	
Owosso	96	35[b]	69.4[a]	1.30	
Petoskey	89	34	63.2	2.68	
Port Austin	96	35	64.2	T.	
Reed City	97	34	70.6	2.51	
Saginaw	96	36	69.6	1.57	
St. Ignace	87	40	60.8	3.52	
St. Johns	95	36	68.6	3.41	
St. Joseph	96	44	69.6	1.30	
Sidnaw	98	30	60.9	3.85	
Somerset	91	35	67.0	2.23	
South Haven	95	37	65.4	3.04	
Stanton	96	34	70.2	2.37	
Thomaston	96	34	67.6	2.24	
Thornville	91	38	68.2	2.56	
Traverse City	102	33	65.8	2.16	
Wasepi	92	37	68.8	3.99	
Waverly	98°	33°	68.5°	2.70	
West Branch	94	36	60.4	2.10	
Wetmore	95	23	62.5	1.00	
Whitecloud	97	30	69.1	.....	
Whitefish Point	91	34	55.2	3.08	
Williamston	92	37	68.1	2.58	
Ypsilanti	91	35	67.0	1.79	
Minnesota.					
Ada	90	31	63.4	7.83	
Alexandria	91	35	64.8	4.56	
Ashby	90	31	65.2	4.87	
Beardsley	95	31	64.6	5.36	
Bemidji	90	32	63.8	7.01	
Bird Island	94	31	67.2	5.95	
Blooming Prairie	95	32	67.8	5.30	
Brainerd[1]	85	32	63.0	4.43	
Caledonia	96	33	69.5	2.78	
Campbell	92	31	66.2	5.34	
Collegeville	92	35	66.8	4.22	
Crookston	91	31	62.8	7.41	
Currie	93	31	67.2	.....	
Deephaven	.....	.....	.....	6.23	
Detroit City	89	32	63.0	5.21	
Faribault	97	33	70.4	9.74	
Farmington	95	37	68.7	5.08	
Fergus Falls	92	33	65.0	4.90	
Glencoe	93	30	66.1	7.05	
Grand Marais	.....	.....	.....	4.53	
Grand Meadow	98	32	68.7	2.57	
Hallock	89	29	61.2	5.67	
Hovland	.....	.....	.....	5.47	
Lake Jennie	92	34	67.7	6.41	
Lakeside	92	33	67.8	6.78	
Lake Winnibigoshish	92	31	60.7	8.49	
Leech	91	33	62.2	10.37	
Long Prairie	93°	32°	66.0[d]	5.23	
Luverne	93	34	67.3	4.24	
Lynd	93	35	67.4	4.33	
Mapleplain	94	36	68.5	4.84	
Milaca	94	34	63.6	6.40	
Milan	94	31	66.5	4.60	
Minneapolis *a*	96	36	69.2	6.67	
Minneapolis *b*[1]	96*	37	69.1	6.75	
Montevideo	96	31	67.6	4.29	
Morris	94	32	66.4	3.63	
Mount Iron	94	30	60.6	8.99	
Newfolden	88	28	60.6	8.62	
New London	96	33	68.2	2.79	
New Richland*[1]	98	32	68.6	.....	
New Ulm	98	33	69.5	5.61	
Park Rapids	91	33	62.6	6.24	
Pine River	91	36	62.0	8.83	
Pipestone	90	30	65.0	6.07	
Pleasant Mounds	93	32	67.6	3.88	
Pokegama Falls	91	26	60.4	9.27	
Redwing *a*	.....	.....	.....	5.42	
Redwing *b*	99	41	70.7	4.99	
Reeds	.....	.....	.....	7.00	
Rolling Green	92	35	68.4	2.50	
St. Charles	98	36	68.4	3.80	
St. Cloud	94	34	64.9	4.67	
St. Peter	97	33	69.5	4.91	
Sandy Lake Dam	91	33	62.8	7.51	
Shakopee	94	38	67.4	6.81	
Thief River Falls	.....	.....	.....	3.89	
Tower	96	32	61.2	7.73	T.
Two Harbors	87	35	55.1	8.37	
Wabasha*[2]	.....	45	67.8	6.30	
Warroad	92	30	59.4	5.00	
Willmar	91	34	65.6	5.23	
Willow River	93	34	62.0	7.76	
Winnebago City	94	33	69.1	3.82	
Worthington	91	33	67.6	3.80	
Wyoming	.....	.....	.....	3.56	
Zumbrota[1]	96*	37	69.5	.....	
Mississippi.					
Aberdeen	104	50	78.8	2.13	
Agricultural College	103	56	81.4	3.75	
Austin	97	50	78.8	0.38	
Batesville	103	50	80.2	1.54	
Bay St. Louis	102	68	82.1	2.86	
Biloxi	98	66	80.8	4.25	
Booneville	96	57	78.4	1.80	
Canton	98	58	79.4	1.10	
Cleveland	100	51	77.2	1.41	
Columbus *b*	99	58	80.0	0.78	
Corinth	99	52	80.8	2.55	
Crystalsprings	100	61	79.9	5.19	
Edwards	100	60	82.2	2.79	
Fayette	100	57	79.6	1.00	
Fayette (near)*[1]	100	65	83.1	0.92	
Greenville *a*	99	61	81.0	1.22	
Greenville *b*	99	59	81.5	1.30	
Hattiesburg	98	59	83.6	0.47	
Hazlehurst	102[1]	60	82.2*	5.44	
Hernando	99	51	79.6	1.10	
Holly Springs	99	53	79.8	2.87	
Indianola	98	51	80.8*	1.54	
Jackson	100	56	80.2	5.84	
Kosciusko	101	54	79.6	1.40	
Lake	96	55	76.8	5.90	
Leakesville	103	58	80.8	2.40	
Louisville	99	54	78.6	1.69	
Macon	103	54	80.9	1.44	
Magnolia	102	59	80.6	2.96	
Natchez	98	61	80.6	1.75	
Nittayuma	99	57	80.4	0.59	
Okolona	103	54	80.9	0.87	
Palo Alto	98	56	80.2	2.53	
Pearlington	102	62	80.2	1.53	
Pontotoc	98	51	79.0	0.16	
Poplarville	97	61	82.6	4.47	
Ripley	98	47	77.2	1.54	
Saratoga	102	58	79.8	4.00	
Shoccoe	.....	.....	.....	2.58	
Stonington*[1]	96	62	79.6	2.44	
Suffolk	103	56	80.4	2.17	
Thornton	96	62	82.0	1.20	
Tupelo	.....	.....	.....	1.59	
Walnutgrove	96	66	81.2	1.27	
Watervalley	101	63	82.6*	1.43	
Waynesboro	98	66	81.8	4.19	
Windham[1]	101	60	79.4	6.90	
Woodville	101	61	81.8	1.63	
Yazoo City	102	56	80.9	3.31	
Missouri.					
Appleton City	.....	55	.....	1.64	
Arthur	104	47	79.4	0.56	
Avalon	103	48	79.0	0.56	
Bagnell	.....	.....	.....	0 95	
Bethany	100	43	74.0	4.07	
Birchtree	98	46	76.6	1.58	
Boonville	.....	.....	.....	3.56	
Brunswick	99	51	76.7	1.43	
Carrollton	100	46	75.3	1.77	
Cook Station	105	44	78.2	1.10	
Darksville	101	40	76.8	1.62	
Dean	102	45	78.1	1.92	
Desoto	105	51	78.4	1.33	
Downing	.....	.....	.....	4.31	
Edgehill*[5]	102	56	80.6	0.63	
Edwards	104	43	78.2	0.97	
Eightmile*[5]	106	50	71.6	0.75	
Eldon	103	48	77.7	0.67	
Fairport	.....	.....	.....	2.68	
Fayette	103	50	78.1	2.92	
Fulton	101	49	77.4	1.69	
Galena	.....	.....	.....	2.38	
Gallatin*[1]	101	52	77.0	1.60	
Gayoso	103	50	80.4	1.92	
Glasgow	101	47	78.1	3.04	
Gorin	.....	.....	.....	4.54	
Halfway	100	48	77.6	2.74	
Harrisonville	104	49	79.6	0.59	
Hazlehurst	.....	.....	.....	2.04	
Hermann	.....	.....	.....	1.09	
Houston	101	41	76.2	3.84	
Irena	.....	.....	.....	4.42	
Ironton	103	40	77.1	2.36	
Jackson	102	44	77.3	2.01	
Kidder	102	48	76.4	1.56	
Koshkonong	101	54	79.5	1.06	
Lamar	102	51	79.3	0.97	
Lamonte	.....	.....	.....	0.43	
Lebanon	102	50	79.2	1.87	
Lexington	102	48	79.4	0.77	
Liberty	101	48	77.6	1.43	
McCune*[1]	101	55	79.3	2.71	
Macon	102	50	78.3	1.66	
Marblehill	103	44	77.2	2.64	
Marshall	100	47	76.8	2.52	
Maryville	101	47	75.1	4.90	
Mexico	105	49	79.1	2.07	
Miami*[5]	101	55	82.2	1.07	
Mineralspring	101	51	79.4	0.86	
Montreal	102	45	77.6	2.10	
Mountaingrove	100	48	77.7	1.20	
Mount Vernon	102	44	79.4	0.42	
Neosho	98	45	77.0	1.31	
Nevada	.....	.....	.....	0.26	
New Haven	103	50	79.0	2.67	
New Madrid *a*	99	54	79.6	.....	
New Madrid *b*	.....	.....	.....	1.21	
New Palestine	103	53	79.0	1.29	
Oakfield	105	50	79.2	1.18	
Olden	98	48	77.4	0.92	
Oregon *a*	101	52	76.4	2.75	
Palmyra*[5]	100	50	78.2	5.31	
Phillipsburg*[1]	103	60	79.0	1.69	
Pine Hill	.....	.....	.....	1.81	
Poplarbluff	102	46	78.6	1.37	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Potosi	104	43	76.0	0.78	
Princeton	105	47	78.2	3.13	
Richmond	100	58	78.2	1.06	
Rockport	.....	.....	....	3.73	
Rolla	.....	.....	.....	2.30	
St. Charles	104	51	78.2	1.10	
St. Joseph	.....	.....	.....	1.03	
Sarcoxie *2	.....	56	76.0	1.23	
Sedalia	.....	.....	.....	2.12	
Seymour	99	47	76.8	1.78	
Shelbina	.....	.....	.....	2.50	
Sikeston	100	48	78.0	2.16	
Steffenville	102	49	77.6	3.66	
Sublett	101	43	76.5	3.25	
Trenton	97	50	76.7	4.85	
Unionville	105	46	77.8	4.77	
Vichy	102	47	77.4	2.76	
Warrensburg	103	53	80.1[e]	1.11	
Warrenton	105	49	78.1	1.08	
Wheatland	.....	.....	.....	2.46	
Willowsprings	97	49	75.8	3.25	
Windsor	99[e]	49	76.6[e]	0.48	
Zeitonia	103	43	77.4	2.30	
Montana.					
Adel	72	22	48.4	2.91	
Anaconda	76	30	49.8	2.68	T.
Augusta	73	31	50.4	3.57	
Billings	86	36	59.8	.....	
Boulder	78	29	51.6	1.81	T.
Bozeman	76	30	51.8	1.56	
Butte	78	26	49.3	2.00	
Canyon Ferry	87	33	58.0	1.72	T.
Chester	81	30	52.6	1.80	
Chinook	89	32	59.4	1.69	
Clemons	75	28	49.0	4.26	3.0
Columbia Falls	82	26	51.2	5.18	2.0
Corvallis	87	31	57.8	1.12	
Crow Agency	86	31	60.4	1.79	
Culbertson	84	32	60 5	3.55	
Dillon	81	32	58.0	2.85	
Fort Benton	80	30	54.6	1.38	
Fort Logan	78	33	50.4	3.59	
Glasgow	92	32	56.0	4.06	
Glendive	86	35	64.0	4.67	
Glenwood	77	28	50.4	2.46	.....
Greatfalls	77	36	55.8	2.63	
Kipp	75	23	48.2	3.21	4.5
Lewistown	79	28	53.6	3.50	
Livingston	82	30	56.0	1.65	T.
Manhattan	81	30	56.0	0.04	
Martinsdale	78	27	51.8	5.11	
Marysville	76	30	48.0	1.22	0.1
Missoula	84	30	53.3	1.68	T.
Ovando	78	25	48.0	3.03	.....
Parrot	81	34	55.4	0.97	
Plains	82	29	52.3	1.21	
Poplar	89	34	61.3	3.70	
Ridgelawn	83	35	60.6	7.14	
St. Pauls	76	28	53.6	2.33	
St. Peter	74	27	48.5	4.52	T.
Troy	86	30	53.2	3.38	T.
Twin Bridges	81	31	53.2	.....	
Utica	82	28	52.3	3.97	
Wibaux	85[e]	31[e]	59.2[e]	7.42	
Yale	80	24	50.0	2.28	
Nebraska.					
Agate	.....	.....	.....	2.47	T.
Agee *1	100	42	70.3	13.27	
Albion	98	40	71.0	7.80	
Alliance	99	33	65.2	2.80	
Alma	103	40	75.8	1.71	
Ansley	99	34	69.4	8.08	
Arapahoe	.....	.....	.....	1.81	
Arborville *1	106	48	73.3	3.16	
Arcadia	.....	.....	.....	5.95	
Arlington	.....	.....	.....	5.75	
Ashland *a*	104	44	74.5	3.20	
Ashland *b* *1	105	51	78.2	4.02	
Ashton	.....	.....	.....	3.62	
Auburn	102	46	74.9	5.18	
Aurora	.....	.....	.....	2.16	
Bartley	.....	.....	.....	1.96	
Beatrice	105	45	75.2	2.93	
Beaver	107	38	75.6	0.95	
Bellevue	.....	.....	.....	5.30	
Benedict	.....	.....	.....	2.71	
Benkleman	.....	.....	.....	6.27	
Blair	95	39	71.1	6.95	
Bluehill *1	95	50	73.4	2.91	
Bradshaw	.....	.....	.....	3.24	
Brokenbow *1	100	35	70.0	9.26	
Burchard	.....	.....	.....	2.05	
Burwell	.....	.....	.....	8.63	
Callaway	98	32	69.7	8.30	
Camp Clarke	98	33	65.2	2.06	
Central City	.....	.....	.....	1.75	
Chester	.....	.....	.....	3.70	
Cody	.....	.....	.....	4.50	
Columbus	100	42	72.5	3.34	
Crete	103	45	74.7	2.88	
Culbertson	.....	.....	.....	1.90	
Curtis	101[d]	35[d]	70.8[d]	5.37	
Dannebrog	.....	.....	.....	5.68	
David City	101	39	73.2	4.25	
Dawson	104	49	76.5	2.46	
Eden	.....	.....	.....	1.73	
Edgar *a*	.....	.....	.....	1.30	
Ericson	.....	.....	.....	5.06	
Ewing	.....	.....	.....	6.01	
Fairbury	109	44	75.5	3.08	
Fairfield	104	44	75.4	0.97	
Fairmont	103	41	74.0	1.60	
Fort Robinson	93	34	61.7	4.66	
Franklin [d]	105	39	73.6	1.02	
Fremont	99	41	72.8	5.50	
Fullerton	.....	.....	.....	3.86	
Geneva	104	43	76.6	1.62	
Genoa	100	44	72.4	4.85	
Gering	95	36	64.7	4.01	
Gordon	.....	.....	.....	4.50	
Gosper	.....	.....	.....	1.97	
Gothenburg	.....	.....	.....	7.57	
Grand Island *a*	100	54	73.6	3.08	
Grand Island *b*	103	42	74.7	2.88	
Grand Island *c*	104	42	75.4	3.21	
Greeley	.....	.....	.....	3.35	
Guide Rock	.....	.....	.....	1.77	
Haigler	.....	.....	.....	1.71	
Hartington	97	36	69.8	5.05	
Harvard	103	41	74.4	1.25	
Hastings *1	102	50	74.8	2.49	
Hayes Center	.....	.....	.....	3.80	
Hay Springs	91	40	60.6	5.13	
Hebron	105	46	75.3	2.89	
Hickman	.....	.....	.....	3.75	
Holbrook	.....	.....	.....	1.80	
Holdrege	102	40	75.7	0.85	
Hooper *1	100	46	73.5	5.10	
Imperial	106	35	70.4	3.57	
Johnstown	.....	.....	.....	8.36	
Kearney	103	42	72.5	3.15	
Kennedy	98	26	67.0	10.45	
Kimball	98	33	64.7	4.29	
Kirkwood *1	95[e]	47[e]	67.2[e]	11.20	
Laclede	.....	.....	.....	2.32	
Lena	.....	.....	.....	2.65	
Lexington	100	34	71.2	7.27	
Lodgepole	95	30	64.7	3.70	
Loup	.....	.....	.....	6.47	
Lynch	100	36	69.2	10.64	
Lyons	.....	.....	.....	6.24	
McCook *1	102	52	73.9	4.27	
Madison	98	41	69.5	5.55	
Madrid	.....	.....	.....	4.38	
Marquette	.....	.....	.....	2.32	
Mason City	.....	.....	.....	7.33	
Minden *a*	102	39	72.2	3.80	
Monroe	.....	.....	.....	4.43	
Nebraska City *b*	.....	.....	.....	5.35	
Nebraska City *c*	99	.....	.....	3.96	
Nemaha	.....	.....	.....	2.12	
Nesbit	98	33	68.1	6.01	
Norfolk	99	39	70.4	8.10	
North Loup	101	36	71.4	4.79	
Oakdale	98	40	70.8	7.34	
Odell	.....	.....	.....	2.25	
O'Neill	99	39	70.2	9.68	
Ord	.....	.....	.....	5.52	
Osceola	.....	.....	.....	3.05	
Ough	.....	.....	.....	3.33	
Palmer	.....	.....	.....	2.62	
Palmyra *1	104	50	74.6	2.29	
Plattsmouth *a*	.....	.....	.....	4.44	
Plattsmouth *b*	106	46	72.6	4.07	
Pleasanthill	.....	.....	.....	2.18	
Ravenna *a*	101	40	72.2	3.63	
Ravenna *b*	.....	.....	.....	3.59	
Redcloud *b*	101	44	74.6	4.41	
Republican	.....	.....	.....	1.80	
Rulo	.....	.....	.....	3.00	
St. Libory	.....	.....	.....	4.51	
St. Paul	101	39	72.6	4.17	
Salem *1	98	59	78.8	2.69	
Santee	98	35	70.6	9.09	
Schuyler	.....	.....	.....	4.91	
Seneca *1	98	42	69.4	0.65	
Seward	103	48	74.7	2.03	
Smithfield	.....	.....	.....	2.84	
Spragg	.....	.....	.....	8.70	
Springview	94[e]	42[e]	69.0[e]	8.84	
Stanton	98	39	70.4	8.95	
State Farm	105	43	75.9	1.59	
Strang	.....	.....	.....	1.34	
Stratton	.....	.....	.....	4.45	
Superior	103	49	76.7	2.10	
Syracuse	.....	.....	.....	3.85	
Tablerock	.....	.....	.....	1.94	
Tecumseh *b*	105	46	75.6	2.70	
Tecumseh *c*	.....	.....	.....	3.56	
Tekamah	100	39	73.0	7.69	
Turlington	102	45	73.8	3.71	
Wakefield	98	34	70.2	5.58	
Wallace	.....	.....	.....	4.33	
Wauneta	.....	.....	.....	3.66	
Weeping Water	.....	.....	.....	2.80	
Westpoint	101	43	73.2	9.06	
Whitman	.....	.....	.....	1.68	
Wilber *1	106	60	76.6	1.67	
Willard	.....	.....	.....	3.73	
Wilsonville	.....	.....	.....	1.90	
Winnebago	.....	.....	.....	3.54	
Wisner	.....	.....	.....	6.32	
Wymore	.....	.....	.....	3.12	
York	103	43	75.1	2.20	
Nevada.					
Amos	98	27	59.6	0.12	
Austin	87	30	58.5	0.05	
Battle Mountain *1	93	40	64.3	0.00	
Belmont	90	29	59.6	0.10	
Beowawe *1	97	48	69.2	0.00	
Candelaria	92[e]	37[e]	64.7[e]	T.	
Carlin *1	90	49	59.9	0.00	
Carson City	94	30	59.6	0.17	
Cranes Ranch	.....	.....	.....	0.20	
Elko (near)	90	26	56.5	T.	
Ely	95	25	59.6	0.36	
Fenelon	.....	.....	.....	T.	
Golconda *1	94	38	63.9	0.22	
Halleck *1	90	38	60.4	0.35	
Hamilton	96[e]	25	57.9[e]	0.70	7.0
Hawthorne	96	40	66.6	0.00	
Hot Springs *1	98	55	73.6	0.00	
Humboldt *1	90	50	65.1	0.00	
Lee	.....	.....	.....	0.62	
Lewers Ranch	94	32	60.2	0.49	
Lovelocks *a* *1	93	48	68.6	0.00	
Lovelocks *b*	94	32	63.1	0.00	
Martins	99	29	63.1	0.00	
Mill City	100	48	66.7	0.00	
Monitor Mill	93	24	56.5	0.37	
Newland	96	25	55.8	0.35	
Owyhee	84	25	54.2	0.55	T.
Palisade *1	93	48	70.2	0.00	
Palmetto	98	21	58.7	0.25	
Potts	93	26	58.0	0.05	
Reno State University	95	36	60.7	T.	
Sodaville	94	34	67.0	0.00	
Tecoma *1	100	40	58.3	0.00	
Toano *5	94	35	63.8	0.07	
Tybo	99	30	63.3	0 10	
Verdi *1	95	36	54.3	T.	
Wadsworth *1	102	54	72.2	0.10	
Wells *1	83	37	59.3	T	
Wood	87	23	57.8	0.66	
New Hampshire.					
Alstead	96	38	66.0	1.78	
Berlin Mills	97	32	63.7	2.75	
Bethlehem	92	40	64.5	4.34	
Brookline *1	100	36	69.5	2.21	
Chatham	95	37	64.2	3.16	
Claremont	101	37	69.5	0.39	
Concord	100	35	66.9	1.87	
Durham	97	40	66.6	0.35	
Grafton	99	30	64.4	1.33	
Hanover	98	36	65.8	1.44	
Keene	98	34	66.3	1.95	
Littleton	91	38	63.8	3.21	
Nashua	100	38	68.3	1.66	
Newton	95	37	65.2	1.39	
Peterboro	98	34	65.8	1.16	
Plymouth	100	34	67.4	1.75	
Sanbornton	96	38	64.7	1.96	
Stratford	94	33	64.4	4.33	
New Jersey.					
Asbury Park	93	49	67.0	1.49	
Bayonne	98	48	70.2	0.89	
Belvidere	97	46	70.8	1.84	
Bergen Point	96	47	69.8	1.08	
Beverly	100	45	71.2	1.91	
Billingsport *1	94	54	72.3	1.40	
Blairstown	100	42	70.2	1.81	
Bridgeton	100	48	73.0	1.49	
Cape May C. H.	97	51	69.6	2.09	
Charlotteburg	96	35	66.1	2.89	
Chester	94	42	68.0	3.07	
Clayton	101	47	71.0	1.31	
College Farm	100	44	70.9	0.81	
Deckertown	96	42	69.8	1.56	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Dover	100	40	69.3	1.90	
Egg Harbor City	102	46	70.0	1.62	
Elizabeth	101	47	71.8	0.73	
Englewood	98	52	69.1	1.11	
Flemington	100	45	72.2	0.97	
Freehold	94	45	69.5	2.05	
Friesburg	101	45	70.4	1.18	
Hanover	96	42	69.2	1.84	
Hightstown	96	46	70 0	1.21	
Imlaystown	98	46	71.8	1.74	
Indian Mills	101	45	71.8	1.55	
Lambertville	98	44	71.2	1.09	
Lakewood	95	45	69.3		
Layton	96	38	67.8	1.54	
Moorestown	97	48	70.4	2.21	
Mount Pleasant				2.08	
Newark	98	45	70.2	1.07	
New Brunswick	102	46	72.4	0.85	
New Egypt				1.79	
Newton	97	47	70.2	2.19	
Oceanic	95	48	68.6	1.09	
Paterson	98	46	72.3	1.91	
Perth Amboy	102	49	71.4	1.08	
Plainfield	97	42	69.7	1.16	
Rancocas				2.19	
Rivervale	96	43	69.1	1.49	
Roseland	97	41	68.3	1.64	
Salem	102	47	72.1	2.08	
Somerville	101	42	71.4	1.14	
South Orange	100	45	70.0	1.34	
Three Bridges				1.01	
Toms River	98	40	68.2	4.36	
Trenton	96	48	70.5	1.22	
Tuckerton	101	43	68.8	1.37	
Vineland	103	48	71.6	2.29	
Woodbine	90[f]	49[f]	68.7[f]	1.71	
Woodstown				1.29	
New Mexico.					
Alamagordo				0.38	
Albert	90	47	74.0	0.79	
Albuquerque	97	42	72.3	0.30	
Alma	97	35	66.0	0.00	
Aztec	96	47	72.8	T.	
Bellranch				0.40	
Bluewater	101	32	67.6	0.50	
Cambray				0.35	
Carlsbad	104[b]	55[b]	81.4[b]		
Deming				T.	
Dolores				0.69	
East Lasvegas	87	38	66.2	0.19	
Engle	99	41	72.4	0.25	
Espanola	100	38	68.2	0.21	
Folsom	88	30	64.6	0.83	
Fort Bayard	94	40	69.8	T.	
Fort Stanton				1.34	
Fort Union	92	36	63.1	1.47	
Fort Wingate	99	34	65.7	0.41	
Gage				0.45	
Gallisteo	93	40	67.3	0.10	
Gallinas Spring	100	47	73.6	2.64	
Las Vegas	97	38	67.0	0.87	
Las Vegas Hotsprings	89	39	63.5	1.70	
Lordsburg				0.00	
Los Lunas	99	42	73.0	T.	
Lower Penasco	98	41	69.8	1.05	
Mesilla Park	104	42	75.6	1.08	
Olio	100	31	68.6	T.	
Raton	94	30	62.7	0.10	
Roswell	101	45	75.8	0.22	
San Marcial	105	45	75.0	0.02	
Socorro	102	44	75.8	0.04	
Springer	97	37	67.0	0.67	
Strauss				0.26	
Whiteoaks	94	40	69.2	1.35	
Woodbury	101	37	70.0	0.12	
New York.					
Adams				4.60	
Addison	95	37	68.0	2.14	
Adirondack Lodge	88	36	60.9	5.79	
Akron				3.43	
Alden	90	40	67.0	1.49	
Angelica	93	32	65.0	3.60	
Appleton	95	40	65.5	2.10	
Arcade	90	34	64.2	3.68	
Atlanta	96	36	65.6	2.10	
Atwell	89	35	62.5	8.06	
Auburn	98	40	70.2	6.35	
Avon	94	40	67.6	2.24	
Axton	91	33	62.6	4.92	
Baldwinsville	98	44	69.7	4.94	
Bedford *a*	94	45	69.0	1.01	
Blue Mountain Lake				4.55	
Bolivar	93	30	64.8	2.94	
Bouckville	92	38	65.4	4.14	
Boyds Corners				1.61	
Brockport	92	42	66.8	3.36	
Caldwell	95	41	65.8	3.94	
Canaan Four Corners	93	42	66.2	2.37	
Canajoharie	93	42	67.0	2.89	
Canton	94	38	66.7	4.91	
Carmel	93	45	71.2	1.33	
Carvers Falls	97	40	66.6	3.08	
Catskill	97	47	69.5	4.12	
Cedarhill	98	45	68.9	3.80	
Chenango Forks				2.00	
Cooperstown	90	42	65.4	3.65	
Cortland				2.96	
Cutchogue	91	47	67.0	1.24	
Dekalb Junction				3.76	
Easton				2.07	
Elba	92	40	67.1	3.38	
Elmira	98	44	70.0	1.84	
Fayetteville	96	40	68.5	7.10	
Franklinville	90	32	64.6	2.74	
Fulton				3.87	
Gabriels	92	36	63.0	5.02	
Glens Falls	98	46	69.2	2.59	
Gloversville	95	42	66.8	3.76	
Greenwich	95°	43°	67.5°	1.84	
Griffin Corners	94	36	64.1	2.82	
Haskinville				3.06	
Hemlock	93	41	67.9	1.90	
Honeymead Brook	94	43	67.6	2.55	
Honnedaga Lake				5.81	
Humphrey	90	35	63.4	4.17	
Indian Lake	92	34	63.5	3.83	
Ithaca	95	42	67.8	3.06	
Jay	98	43	66.5	3.82	
Keene Valley	96	37	65.6	4.25	
King Ferry				3.29	
King Station				3.05	
Liberty	88	26	62.4	4.82	
Littlefalls, City Res	92	42	66.2	3.58	
Lockport	94	44	70.5	1.46	
Lowville	92	40	65.4	3.69	
Lyndonville				1.65	
Lyons	99	43	69.6	6.46	
Mayle				1.00	
Meredith	88	38	64.4	2.39	
Middletown	93	46	70.0	1.42	
Mohonk Lake	89	47	67.8	2.77	
Moira	91	40	67.2	4.63	
Newark Valley				2.57	
New Lisbon	91	32	63.6	4.21	
New Rochelle	97	42	68.3	0.50	
North Germantown				3.60	
North Hammond	88	44	66.8	3.90	
Number Four	89	34	62.9	5.38	
Ogdensburg	87	45	66.5	3.05	
Old Chatham				1.96	
Oneonta[a]	96	40	66.8		
Oxford	93	35	66.3	2.96	
Palermo	94	37	66.2	2.96	
Penn Yan	96	44	69.2	2.82	
Perry City	94	38	67.0	2.85	
Plattsburg Barracks				3.71	
Port Byron	93	40	66.8	4.85	
Port Jervis	96	42	69.8	2.65	
Primrose	98	44	70.5	0.94	
Redhook				1.57	
Richmondville	93	42	66.9	2.54	
Ridgeway	90	42	66.6	2.11	
Rome	94	40	65.0	5.40	
Romulus	96	43	68.8	4.73	
Salisbury Mills				2.31	
Saranac Lake	92	34	63.6	4.79	
Saratoga Springs	96	42	67.8	2.55	
Schenectady	100°	46°	71.0°	2.36	
Scottsville				2.99	
Setauket	92	46	67.6	1.12	
Shortsville	93	42	67.0	2.65	
Skaneateles				6.03	
Southampton	90	45	64.8	1.10	
South Canisteo	91	35	64.8	3.53	
Southeast Reservoir				2.27	
South Schroon	93	35	63.6	3.62	
Straits Corners	92	39	66.4	2.99	
Ticonderoga	93	45	66.8	2.08	
Volusia	90	38	65.1	4.06	
Walton	96	35	66.1	2.97	
Wappingers Falls	95	49	71.4	3.08	
Warwick				1.30	
Watertown	93	42	66.9	3.75	
Waverly	96	37	67.6	2.59	
Wedgwood	91	39	66.4	4.09	
Wells	96	35	65.2	5.73	
West Berne	93	39	66.2	3.13	
West Chazy	94	41	66.5		
Westfield *a*	88	36	67.4	6.30	
Westfield *b*	89	40	67.6	4.79	
Windham	93	38	65.6	4.13	
Wolcott				4.67	
North Carolina.	°	°	°	*Ins.*	*Ins.*
Abshers	94	47	72.4	9.61	
Asheville				2.76	
Biltmore	88	52	72.4	3.12	
Bryson City				3.64	
Chapelhill	100	56	76.4	5 69	
Cherryville	94	52	74.0	4.99	
Currituck				1.53	
Durham	91	56	74.6	2.24	
Fayetteville	94	55	75.8	4.31	
Flatrock	90	41	69.4	10.17	
Goldsboro	92	57	76.8	4.42	
Greensboro	91	56	72.8	7.45	
Henderson	92	54	74.7	3.86	
Hendersonville	90	45	69.8	9.13	
Henrietta	92	48	74.2	10.62	
Highlands	83	41	64.4	9.29	
Horse Cove	85	53	68.6	7.40	
Kinston	96	54	77.4	3.66	
Lenoir				11.67	
Linville	81	42	64.2		
Littleton	94	53	74.0	2.24	
Louisburg	95	54	75.4	1.88	
Lumberton	93	59	76.8	5.47	
Marion	94	49	73.0	10.61	
Marshall	93	46	68.8	2.09	
Mocksville	93	50	73.4	5.93	
Moncure	92	54	74.5	4.80	
Monroe	97	49	74.0	8.15	
Morganton	97	49	73.6	8.90	
Mountairy	92	48	71.8	8.69	
Murphy				6.05	
Newbern	93	57	76.4	3.73	
Oakridge	93	50	73.0	5.72	
Patterson [g1]	88	50	67.7	9.37	
Pittsboro	96	51	75.0	6.01	
Redsprings	94	55	76.2	5.47	
Rockingham	95	54	75.3	11.12	
Roxboro	95	54	73.6	1.88	
Salem	93	52	74.0	5.99	
Salisbury	94	55	73.4	6.58	
Saxon	94	53	74.0	4.68	
Selma	95	54	76.4	6.42	
Settle	94	52	75.2	5.32	
Sloan	93	55	75.6	6.00	
Soapstone Mount	93	50	71.9	5.84	
Southern Pines *a*	99	51	78.2	5.59	
Southern Pines *b*	95	58	76.2	3.83	
Southport	99	62	77.1	4.51	
Springhope [g1]	95	60	74.7	3.35	
Statesville	94	49	73.2	4.65	
Tarboro	99°	55°	77.4°	1.29	
Washington	101	59	79.1	4.41	
Waynesville	88	46	67.8	4.05	
Weldon *a*	92	57	74.4	1.61	
Weldon *b*				1.61	
North Dakota.					
Ashley	94	22	63.5	2.94	T.
Berlin	89	23	61.4	6.37	T.
Bottineau	87	29	58.4	7.08	T.
Buxton	90	30	62.7		
Cando				4.70	0.1
Churchs Ferry	86	28	61.0	7.45	T.
Coalharbor	88	32	60.9	4.60	T.
Devils Lake	86	28	61.4	8.27	
Dickinson	85	33	60.6	3.83	
Donnybrook				5.78	5.0
Dunseith	85	26	58.4	4.37	
Edgely	90	28	64.0	5.63	T.
Ellendale	94	28	65.5	3.25	
Falconer	92	26	61.2	6.37	1.0
Fargo	90	30	63.2	5.94	
Forman	91	28	63.4	5.56	
Fort Berthold	89	31	62.8	4.02	T.
Fort Yates	92	32	64.8	4.81	
Fullerton	92	26	64.0	3.61	T.
Gallatin	86	25	58.1	6.35	T.
Grafton	90	32	65.4	7.45	T.
Hamilton	88	31	60.3	6.08	T.
Hannaford	87	29	61.0	7.91	T.
Jamestown	87	30	62.6	9.71	
Langdon	88	28	58.8	9.21	
Larimore	89	30	60.1	5.93	
Lisbon	91	26	63.2	4.32	
McKinney	89	27	58.3	5.90	0.4
Mayville	90	31	64.0	8.10	
Medora	91	33	61.7	5.44	
Melville	86	30	62.5	6.71	T.
Milton	82	29	58.2	6.10	
Minnewaukon	91	31	62.8	7.07	T.
Minto	91	29	62.0	5.58	
Napoleon	90	27	62.2	6.22	T.
New England	85	31	60.3	5.36	
Oakdale	85	31	59.5	7.62	1.0
Pembina	90	29	60.4	4.60	1.5
Portal	82	30	59.4	6.12	6.0
Power	93	30	62.2	5.78	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
North Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Steele	95	29	62.8	4.80	T.
University	90	30	61.4	8.47	
Valley City	89	30	64.2	8.88	
Wahpeton	92	27	64.4	6.31	
Willow City	93	29	60.2	8.12	
Woodbridge	87	24	58.6	4.71	3.0
Ohio.					
Akron	92	40	69.0	2.31	
Annapolis	92	38	67.8	3.46	
Ashland	92	39	70.4	.....	
Ashtabula	90	39	66.2	3.80	
Atwater	.....	.....	.....	4.54	
Bangorville	96	38	71.2	3.83	
Belfast	.....	.....	.....	3.51	
Bellefontaine	93	40	70.2	1.86	
Bement	.....	.....	.....	2.75	
Benton Ridge	94	41	71.1	3.59	
Bethany	102	40	73.8	2.16	
Bigprairie	92	40	70.0	8.90	
Binola	.....	.....	.....	2.87	
Bladensburg	90	39	68.4	6.20	
Bloomingburg	100	42	72.6	3.65	
Bowling Green	93	38	69.4	3.98	
Bucyrus	96	36	70.4	2.87	
Cambridge	94	42	71.0	4.32	
Camp Dennison	98	41	73.7	2.77	
Canaan	.....	.....	.....	2.81	
Canal Dover	97	39	70.6	3.83	
Canton	95	41	70.8	2.74	
Cardington	94	36	69.8	7.86	
Cedarville	.....	.....	.....	2.14	
Celina	95	37	72.4	3.98	
Chillicothe	96	44	74.0	5.01	
Circleville	95	49	72.4	9.34	
Clarksville	95	41	73.5	2.75	
Cleveland *a*	89	42	68.4	4.29	
Cleveland *b*	94	42	69.5	3.36	
Coalton	97	40	72.3	8.38	
Colebrook	93	33	68.4	2.39	
Dayton *a*	.....	.....	.....	4.92	
Dayton *b*	98	41	73.8	4.04	
Defiance	97	38	70.3	3.47	
Delaware	96	39	71.2	4.75	
Demos	93	42	70.4	5.07	
Elyria	93	39	68.8	3.31	
Findlay	100	40	72.9	2.79	
Frankfort	95	43	71.4	3.74	
Garrettsville	92	32	67.3	4.46	
Granville	98	41	71.3	4.04	
Gratiot	93	42	70.8	6.54	
Green	95	41	74.0	6.36	
Greenhill	91	33	67.6	4.42	
Greenville	92	42	71.0	4.71	
Hanging Rock	98	44	72.8	2.84	
Hedges	96	36	71.2	3.26	
Hillhouse	93	51	66.4	2.95	
Hillsboro	96	40	71.0	2.69	
Hiram	90	43	67.8	4.58	
Hudson	95	36	69.6	2.72	
Jacksonboro	99	42	74.0	3.85	
Killbuck	94	40	70.2	4.16	
Lancaster	94	41	71.4	7.48	
Leipsic	.....	.....	.....	3.95	
Lima	95	37	70.6	5.16	
Lowell	.....	.....	.....	5.47	
McConnelsville	95	44	71.2	8.64	
Manara	.....	.....	.....	4.23	
Mansfield	.....	.....	.....	4.05	
Marietta	93	48	72.1	6.48	
Marion	96	37	71.7	4.70	
Medina	96	36	69.8	4.39	
Milfordton	93	40	69.5	3.94	
Milligan	95	40	70.8	10.01	
Millport	90	35	67.7	6.00	
Montpelier	95	37	70.2	4.01	
Moorfield	98	39	71.0	4.39	
Napoleon	94	39	70.2	5.10	
New Alexandria	97	43	71.6	5.25	
New Berlin	93	37	69.2	3.23	
New Bremen	96	39	72.2	5.14	
New Lexington	.....	.....	.....	10.97	
New Paris	94	49	71.5	5.10	
New Richmond	99	44	74.3	4.98	
New Waterford	92	30	68.9	4.21	
North Lewisburg	96	40	71.6	3.75	
North Royalton	93	37	69.8	3.61	
Norwalk	103	40	69.4	3.32	
Oberlin	98	37	69.8	3.15	
Ohio State University	96	40	71.8	5.79	
Orangeville	93	32	66.6	2.32	
Ottawa	98	38	71.5	2.46	
Pataskala	94	41	70.6	5.32	
Philo	94	42	71.8	5.79	
Plattsburg	97	40	71.6	3.41	
Pomeroy	101	44	73.3	6.79	
Portsmouth *a*	.....	.....	.....	7.05	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Portsmouth *b*	98	41	74.3	7.06	
Pulse	.....	.....	.....	3.76	
Red Lion	.....	.....	.....	2.75	
Richfield	.....	.....	.....	3.36	
Richwood	96	40	71.2	3.51	
Ripley	95	44	73.2	5.52	
Rittman	92	35	68.8	4.76	
Rock	.....	.....	.....	3.79	
Rockyridge	95	37	69.4	3.65	
Rosewood	95	37	70.8	3.29	
Shenandoah	96	37	69.9	5.31	
Sidney	100	41	73.5	4.93	
Sinking Spring	98°	42°	74.3°	4.75	
Somerset	94	42	72.6	5.39	
Springfield	.....	.....	.....	6.92	
Strongsville	.....	.....	.....	3.82	
Swanton	.....	.....	.....	6.68	
Thurman	96	43	73.0	5.28	
Tiffin	93	43	70.6	2.61	
Upper Sandusky	96	39	72.2	6.22	
Urbana	92	41	71.2	3.84	
Vanwert	95	39	71.1	2.32	
Vermillion	92	40	68.7	2.59	
Vickery	95	36	69.5	3.88	
Walnut	.....	.....	.....	5.39	
Warren	94°	36	70.0°	5.77	
Warsaw	95	37	70.2	3.62	
Wauseon	98	37	70.2	5.15	
Waverly	99	45	74.6	4.41	
Waynesville	96	40	71.8	3.80	
Wellington	95	38	68.3	3.29	
Westerville	96	37	70.9	5.21	
Willoughby	.....	.....	.....	2.39	
Wooster	91	38	69.1	4.82	
Zanesville	.....	.....	.....	4.63	
Oklahoma.					
Arapaho	102	51	78.6	2.28	
Beaver	104	46	79.1	0.36	
Blackburn	98	45	78.4	4.17	
Burnett	97	50	79.2	1.57	
Clifton	99	47	78.6	3.12	
Enid	102	58	83.1	0.58	
Fort Reno	98	50	77.8	1.35	
Fort Sill	99	53	78.5	1.25	
Hennessey	104	54	81.8	1.35	
Jefferson	104	50	81.0	5.93	
Jenkins	101	48	78.1	0.51	
Kenton	100	40	72.4	1.02	
Kingfisher	100	51	79.2	1.98	
Mangum	100	62	81.4	2.35	
Newkirk	100	54	80.2	2.75	
Pawhuska	99	49	79.6	2.10	
Perry	98	48	78.2	5.82	
Prudence	105	49	80.2	1.10	
Sac and Fox Agency	99	48	79.0	1.85	
Stillwater	97	52	79.8	0.79	
Taloga	103	58	81.6	0.33	
Vittum	97	61	80.0	1.55	
Waukomis	102	49	79.8	1.08	
Woodward	103	49	80.3	0.00	
Oregon.					
Albany *a*	88	50	60.1	0.54	
Albany *b*	.....	.....	.....	1.77	
Alpha	85	37	55.8	0.99	
Arlington	93	40	63.6	.....	
Ashland *b*	90	37	61.6	0.20	
Aurora	87	47	55.6	0.59	
Aurora (near)	88	40	57.0	1.21	
Bay City	66	37	52.5	3.86	
Bend	84	23	51.9	.....	
Beulah	98	24	58.2	0.19	
Blalock	95	43	65.4	0.12	
Brownsville	87	46	60.2	1.34	
Burns	85	23	53.6	0.15	
Burns (near)	89	28	55.8	0.00	
Cascade Locks	89	44	61.8	1.95	
Comstock	90	48	59.8	0.37	
Coquille	.....	.....	.....	0.69	
Corvallis	89	38	57.4	1.09	
Dayville	85	36°	57.7°	0.79	
Ella	.....	.....	.....	0.70	
Eugene	84	40	58.2	1.40	
Fairview	74	37	57.0	0.63	
Falls City	84	35	55.2	0.82	
Gardiner	76	40	56.6	2.77	
Glenora	88	36	53.2	3.01	
Government Camp	81	30	45.8	5.64	15.0
Grants Pass	93	31	59.3	T.	
Hare	70	39	51.9	1.19	
Harris	86	38	59.4	0.70	
Hood River (near)	95	37	58.2	0.42	
Huntington	92	35	64.3	0.22	
Jacksonville	92	35	60.8	0.04	
Joseph	79	23	48.9	1.57	2.0
Junction City	90	46	62.6	.....	
Kerby	91	31	60.2	0.00	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Klamath Falls	89	29	57.2	.....	
Lafayette	93	45	58.4	1.16	
Lagrande	84	30	55.8	1.15	0.4
Lakeview	88	26	57.4	T.	
Lonerock	84	29	53.1	0.39	T.
McMinnville	89°	38°	56.3°	1.04	
Merlin	92	45	64.8	0.00	
Monroe	85	38	56.7	0.86	
Mount Angel	87	41	58.0	1.19	
Nehalem	.....	.....	.....	3.79	
Newberg	90	34	56.8	1.11	
Newbridge	87	24	57.6	0.24	
Newport	65	41	53.6	2.48	
Pendleton	95	35	63.4	0.65	
Placer	.....	.....	.....	0.12	
Prineville	91	24	59.7	0.10	T.
Riddles	90	42	60.4	0.85	
Riverside	94	22	59.2	0.35	
Salem *b*	86	43	58.5	1.45	
Sheridan	92	45	58.1	1.00	
Silverlake	85	13	50.6	0.04	T.
Silverton	90	50	61 8	1.71	
Sparta	82	21	52.2	1.40	2.0
Springfield	82	43	58.6	0.91	
Stafford	89	40	57.0	2.23	
The Dalles	93	40	62.0	0.20	
Tillamook	.....	.....	.....	2.39	
Toledo	80	36	54.8	1.93	
Umatilla	.....	.....	.....	0.48	
Vale	90	22	58.8	0.47	
Westfork	96	50	65.5	0.13	
Weston	89	32	56.8	0.90	
Williams	98	33	58.8	T.	
Pennsylvania.					
Aleppo	93	41	69.4	4.16	
Altoona	93	36	66.9	4.04	
Athens	94	39	68.5	4.11	
Bellefonte	94	39	70.1	3.26	
Brookville	.....	.....	.....	3.98	
Browers Lock	.....	.....	.....	2.77	
Butler	91	33	67.6	7.43	
Cassandra	91	34	66.0	4.21	
Coatesville	98	44	70.8	2.55	
Davis Island Dam	.....	.....	.....	6.51	
Derry Station	96	39	70.6	4.27	
Doylestown	.....	.....	.....	3.29	
Driftwood	.....	.....	.....	2.94	
Duncannon	.....	.....	.....	1.98	
Dushore	94	33	65.3	3.34	
East Bloomsburg	.....	.....	.....	2.33	
East Mauch Chunk	99	42	69.8	1.98	
Easton	94	48	70.8	2.29	
Ellwood Junction	.....	.....	.....	6.23	
Emporium	91	35	67.2	4.39	
Ephrata	99	43	70.6	1.58	
Everett	93	34	69.0	5.21	
Forks of Neshaminy	92	54	70.9	2.39	
Franklin	91	33	67.0	1.72	
Freeport	.....	.....	.....	7.13	
Girardville	.....	.....	.....	1.39	
Greensboro	.....	.....	.....	5.88	
Hamburg	.....	.....	.....	4.55	
Hamlinton	92	43	66.6	2.17	
Hawthorn	97	35	69.7	3.53	
Herrs Island Dam	.....	.....	.....	4.60	
Huntingdon *a*	98	36	69.5	2.36	
Huntingdon *b*	.....	.....	.....	1.59	
Irwin	95	44	75.3	4.34	
Johnstown	97	39	69.8	6.14	
Keating	.....	.....	.....	2.17	
Kennett Square	98	41	70.3	1.63	
Lansdale	.....	.....	.....	1.87	
Lawrenceville	.....	.....	.....	1.61	
Lebanon	97	40	70.0	3.24	
Leroy	90	40	66.6	3.44	
Lewisburg	96	43	69.6	2.09	
Lockhaven *a*	100	39	71.6	3.48	
Lockhaven *b*	.....	.....	.....	3.53	
Lock No. 4	.....	.....	.....	3.96	
Lycippus	90	38	68.2	4.49	
Mifflin	.....	.....	.....	2.95	
Oil City	.....	.....	.....	5.37	
Ottsville	.....	.....	.....	2.03	
Parker	.....	.....	.....	4.57	
Philadelphia	98	51	72.6	1.85	
Point Pleasant	.....	.....	.....	0.88	
Pottstown	92	52	72.0	2.52	
Pottsville	.....	.....	.....	2.13	
Quakertown	96	42	69.5	2.48	
Reading	.....	.....	72.2	3.12	
Renovo *a*	.....	.....	.....	6.01	
Renovo *b*	94	40	69.5	5.77	
Saegerstown	91	32	66.6	5.63	
St. Marys	90	35	64.6	4.20	
Selsholtzville	.....	.....	.....	2.50	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
Selinsgrove	95	39	69.4	2.50	
Shawmont	.....	.....	.....	1.48	
Shinglehouse	93	34	66.4	2.76	
Smethport	92	32	65.0	3.73	
Smiths Corners	.....	.....	.....	1.34	
Somerset	94	33	65.6	3.73	
South Eaton	92	43	67.7	3.01	
State College	91	39	68.0	2.46	
Swarthmore	95	48	72.3	.....	
Towanda	92	39	67.7	4.26	
Troutrun	.....	.....	.....	4.83	
Uniontown	92	44	70.4	7.61	
Warren	90	35	65.2	4.62	
Wellsboro	93	36	66.0	4.17	
Westchester	95	48	70.8	1.32	
West Newton	.....	.....	.....	4.81	
Westtown [b]	91	45	65.2	1.29	
Wilkesbarre	96	43	70.9	2.48	
Williamsport	95	43	72.4	2.99	
York	103	42	72.4	1.55	
Rhode Island.					
Bristol	86	49	64.4	1.21	
Kingston	93	44	65.0	1.32	
Pawtucket	95	51	71.2	0.86	
Providence a	98	50	71.7	1.00	
South Carolina.					
Allendale	99	60	79.0	4.97	
Batesburg	102	59	77.7	4.68	
Beaufort	98	64	78.7	8.62	
Blackville	98	57	78.2	6.34	
Calhoun Falls	.....	.....	.....	5.84	
Camden	.....	.....	.....	6.34	
Cheraw a	93	55	75.2	9.70	
Cheraw b	.....	.....	.....	10.05	
Clemson College	98	51	75.8	7.92	
Conway	.....	.....	.....	5.79	
Darlington	.....	.....	.....	5.99	
Edisto	.....	.....	.....	5.83	
Effingham	.....	.....	.....	6.26	
Florence	97	60	77.6	6.09	
Gaffney	.....	.....	.....	4.36	
Georgetown	89	58	76.3	11.65	
Gillisonville	101	59	78.4	7.93	
Greenville	90	52	72.0	7.99	
Greenwood	98	57	77.3	5.09	
Kingstree a	92	58	75.8	7.33	
Kingstree b	.....	.....	.....	7.40	
Liberty	93	50	72.6	8.26	
Little Mountain	99	57	77.7	7.45	
Longshore	101	55	77.4	4.21	
McCall	96	55	76.4	4.04	
Pinopolis [e1]	91	62	75.4	11.92	
St. Georges	96	60	77.1	3.91	
St. Matthews	95	61	77.0	4.41	
St. Stephens	.....	.....	.....	6.62	
Santuck	99	56	76.1	4.16	
Smiths Mills	.....	.....	.....	6.80	
Society Hill	93	59	77.0	6.11	
Spartanburg	97	54	75.6	6.56	
Statesburg	97	59	77.6	7.75	
Summerville	92	61	75.8	7.64	
Temperance	99	56	77.4	4.14	
Trenton	94	62	78.3	7.22	
Trial	93	57	74.2	9.78	
Walhalla	93	48	74.0	3.60	
Winnsboro	98	59	77.2	4.92	
Winthrop College	95	57	73.2	7.88	
Yemassee	100	60	79.2	9.34	
Yorkville	98	59	78.1	3.81	
South Dakota.					
Aberdeen	93	28	65.8	5.82	
Academy	98	35	68.8	7.25	
Alexandria	95	31	67.6	5.61	
Armour	.....	.....	.....	9.46	
Ashcroft	86	33	61.1	5.82	
Badnation	90[d]	35[d]	67.4[d]	5.92	
Bowdle	92	28	63.6	5.48	
Brookings	93	30	65.9	4.51	
Bulkley	.....	.....	.....	4.37	
Canton	94	30	69.1	4.12	
Centerville	.....	.....	.....	7.72	
Chamberlain	97	36	69.7	9.03	
Clark	92	30	64.6	5.51	
Desmet	91	31	65.4	8.39	
Doland	92	28	67.0	6.37	
Elkpoint	96	36	71.1	4.97	
Farmingdale	.....	.....	.....	5.90	
Faulkton	95	29	65.7	4.48	
Flandreau	93	29	65.2	4.83	
Forestburg	96	29	68.6	6.60	
Fort Meade	83	40	61.0	6.78	
Fort Randall	110[f]	35[f]	69.5[f]	10.01	
Gannvalley	98	33	68.8	9.55	
Grand River School	95	29	65.8	4.45	
Greenwood	98	37	70.6	11.62	
Hartman [c]	91	30	65.8	4.33	

Stations	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Highmore	.....	.....	.....	5.93	
Hitchcock	.....	.....	.....	5.56	
Hotch City	97	33	67.0	7.07	
Howard	94	.....	.....	6.05	
Ipswich	97	37	66.6	5.50	
Kimball	94	36	67.8	8.42	
Leola	90[c]	24[c]	61.6[c]	4.35	
Leslie	95	38	67.6	4.03	
Marion	97	31	68.2	9.11	
Mellette	.....	30	.....	6.03	
Menno	100	30	69.2	9.97	
Millbank	97	31	65.4	3.73	
Mitchell	97	31	69.5	6.58	
Mound City	94	29	65.0	5.12	
Oelrichs	92	40	64.0	8.50	
Pine Ridge	96	32	64.0	5.36	
Plankinton	98	28	68.4	9.10	
Redfield	98	37	66.2	6.07	
Rochford	84	28	54.8	5.03	
Ro-ebud	.....	.....	.....	7.52	
St. Lawrence	96[h]	29	66.1[d]	5.85	
Silver City	.....	.....	.....	4.84	T.
Sioux Falls	94	32	67.7	5.12	
Sisseton Agency	90	31	63.9	5.55	T.
Spearfish	84	36	58.8	5.22	
Tyndall	90[c]	33[i]	69.0[h]	9.44	
Vermillion	97	36	71.3	5.51	
Waubay	91	28	63.7	5.61	
Wentworth	92	29	66.1	4.91	
Wessington Springs	96	27	63.2	8.80	
Wolsey	.....	.....	.....	5.01	
Tennessee.					
Andersonville	93	48	75.2	8.40	
Arlington	101	47	78.6	1.52	
Ashwood	100	45	77.2	2.30	
Benton	97	49	75.8	2.72	
Bluff City	.....	.....	.....	6.74	
Bolivar	101	47	78.2	0.41	
Bristol	89	49	71.6	8.18	
Brownsville	103	48	79.2	1.85	
Byrdstown	93	45	74.0	6.81	
Carthage	98	47	77.4	3.95	
Charleston	.....	.....	.....	1.79	
Clarksville	97	51	77.2	2.76	
Clinton	.....	.....	.....	7.28	
Covington	101	48	78.5	2.01	
Decatur	97	49	75.5	2.21	
Dickson	100	45	79.3	1.41	
Dover [g]	99	46	81.5	0.19	
Dyersburg	105	49	80.2	0.21	
Elizabethton	94	45	74.6	8.34	
Elk Valley	93	43	72.8	2.82	
Erasmus	95	39	70.0	2.45	
Florence	96	47	76.2	1.38	
Franklin	96	45	76.6	1.46	
Grace [e1]	100	58	79.6	1.40	
Greeneville	92	49	71.8	3.70	
Harriman	95	50	74.8	4.78	
Hohenwald	101	42	77.2	3.28	
Iron City	98	45	75.3	3.91	
Jackson	98[c]	50[c]	79.5[c]	3.95	
Johnsonville	100	42	77.2	1.22	
Jonesboro [e1]	90	59	72.1	5.43	
Kingston	.....	.....	.....	6.00	
Lafayette [e5]	100	58	76.6	1.73	
Lewisburg	100	46	77.6	1.56	
Liberty	100	45	76.6	1.92	
Lynnville	97	48	76.0	3.68	
Maryville	101	51	76.1	4.19	
Milan	101	48	79.9	1.17	
Newport	94	56	74.5	2.40	
Nunnelly	101	43	76.6	0.65	
Palmetto	99	53	77.7	2.14	
Peryear [e5]	98	50	76.4	2.15	
Pope	99	44	76.3	3.55	
Rogersville	90	51	72.0	2.96	
Rugby	98	40	72.4	7.36	
Savannah	99	49	78.2	2.63	
Sewanee	92	49	72.8	1.10	
Silverlake	84[c]	45[c]	66.9[c]	8.14	
Springdale	95	45	73.4	6.06	
Springfield	101	44	76.7	1.05	
Tazewell	.....	.....	.....	4.59	
Tellico Plains	97	50	75.0	5.41	
Tracy City	103	44	73.6	1.88	
Tullahoma	95	45	73.8	0.80	
Union City	100	51	79.1	0.32	
Waynesboro	98	45	75.7	2.82	
Wildersville	94	48	76.1	1.93	
Yukon	97	50	76.3	2.80	
Texas.					
Alvin	.....	.....	.....	2.63	
Anna	104	51	81.6	T.	
Anson	.....	.....	.....	0.00	
Arthur	.....	.....	.....	3.02	
Austin a	102	59	81.3	1.11	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Texas—Cont'd	°	°	°	*Ins.*	*Ins.*
Austin b [e5]	100	61	80.1	.....	
Ballinger	101	51	82.8	0.12	
Bastrop	98	.....	.....	2.01	
Beaumont	102	59	80.3	4.89	
Beeville	103	59	80.4	2.04	
Big Spring	.....	.....	.....	1.06	
Blanco	100	56	79.6	0.05	
Boerne [e1]	98	63	81.2	1.86	
Booth	.....	.....	.....	1.00	
Bowie	106	54	82.6	0.06	
Brazoria	97	64	81.0	3.32	
Brenham	99	63	82.2	0.74	
Brighton	92	65	81.8	1.33	
Camp Eagle Pass	103	57	83.0	1.40	
College Station	108	.....	.....	.....	
Colorado [g]	102	64	85.0	0.32	
Columbia	101	62	81.0	4.40	
Comanche	102	55	82.2	0.35	
Corsicana	102	49	79.8	0.15	
Cuero	104	51	83.8	1.09	
Dallas	101	55	81.6	0.59	
Danevang	101	60	81.8	2.37	
Dublin	103	57	81.5	0.00	
Duval	98	62	80.7	1.39	
Estelle	102	57	82.6	0.22	
Fort Brown	98	60	82.2	1.00	
Fort Clark	102	62	85.8	2.25	
Fort McIntosh	103	62	87.6	0.40	
Fort Ringgold	100	70	86.0	2.20	
Fort Stockton	.....	.....	.....	0.97	
Fredericksburg [e1]	97	65	82.0	0.69	
Gainesville	102	53	79.8	0.53	
Georgetown	.....	.....	.....	0.55	
Grapevine	102	57	82.2	0.83	
Greenville	103[c]	55[c]	82.1[c]	0.12	
Hale Center	102	56	76.3	T.	
Hallettsville	101	64	83.4	0.47	
Haskell	108	54	85.2	0.00	
Hearne	101	61	84.3	2.40	
Henrietta	103	56	81.8	0.93	
Hewitt	.....	.....	.....	0.63	
Hondo [e3]	98	68	82.8	1.83	
Houston	99	64	82.2	1.47	
Huntsville	98	60	82.2	2.34	
Ira	104	56	81.9	0.35	
Jacksonville	96	56	79.5	2.50	
Jasper	97	63	81.0	3.05	
Kaufman	105	59	84.8	.....	
Kent	.....	.....	.....	0.67	
Kerrville	95	53	77.0	1.59	
Kopperl	.....	.....	.....	1.50	
Lampasas	103	61	82.9	0.39	
Laureles Ranch	.....	.....	.....	1.58	
Llano [e5]	102	62	85.8	0.15	
Longview	103	60	83.4	1.97	
Luling	103	55	81.0	1.85	
Mann	99	56	80.8	0.75	
Menardville	99	54	77.9	0.57	
Mount Blanco	.....	.....	.....	T.	
Nacogdoches	100	56	80.2	5.41	
New Braunfels	99	58	81.0	1.99	
Panter	.....	.....	.....	1.05	
Paris a	103	57	80.8	0.45	
Port Lavaca	96	69	83.4	1.14	
Rhineland	104	61	83.9	T.	
Rockisland	102	61	82.4	0.23	
Rockport [e1]	88	68	75.9	.....	
Runge	104	60	83.7	2.00	
Sanderson	102	69	85.0	0.00	
San Marcos	102	64	81.8	1.11	
San Saba	105	53	84.8	0.43	
Santa Gertrudes Ranch	.....	.....	.....	0.62	
Sherman	97	59	80.8	0.24	
Sugarland	103	62	82.8	1.85	
Sulphur Springs	98	59	80.2	2.14	
Temple a	99	63	81.6	1.37	
Temple b	103	63	82.4	1.02	
Trinity	100	60	81.8	2.14	
Tyler	.....	.....	.....	0.43	
Valentine	108	53	82.1	0.70	
Victoria	.....	.....	.....	1.14	
Waco	102	62	83.4	1.89	
Waxahachie	102	59	81.9	0.50	
Weatherford	104	58	83.0	0.08	
Wichita Falls	.....	.....	.....	1.65	
Utah.					
Aneth	104	43	71.8	0.51	
Blackrock	97	34	63.6	0.94	
Bluecreek [e1]	95	45	69.1	0.05	
Castledale	94	28	60.2	0.10	
Cisco	106	38	69.7	0.00	
Corinne	94	32	64.4	0.30	
Coyoto	91	25	58.0	0.20	
Deseret	99	35	63.8	0.62	
Emery	97	32	61.6	T.	
Farmington	91	40	66.4	0.41	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fillmore	106	34	66.1	0.57	
Fish Springs	97°	36[d]	67.4°	0.24	
Fort Duchesne	97	33	64.2	0.08	
Frisco [k]	100	31	68.8	0.97	
Giles	106	37	69.6	0.03	
Government Creek	94	32	62.3	0.54	
Green River	109[d]	42[d]	70.2[d]	0.11	
Grover	95	38	63.6	0.20	
Heber	92	30	58.4	0.08	
Henefer	86	25	56.0	0.12	
Hite	111	40	76.6	T.	
Huntsville	.....	.....	.....	0.04	
Kelton *[l]	95	48	68.6	T.	
Lasal	93	32	61.6	0.23	
Levan	96	35	63.1	0.29	
Loa	91	19	54.6	0.10	
Logan	88	34	61.4	0.41	
Manti	99	32	62.0	0.15	
Marysvale	96	30	61.0	0.47	
Meadowville	83	27	54.5	0.15	
Millville	.....	.....	.....	0.34	
Minersville	98	35	65.4	0.55	
Moab	103	42	70.6	0.30	
Mount Pleasant	94	33	61.5	0.29	
Ogden *[l]	93	49	68.1	0.22	
Park City	88	27	58.7	0.20	T.
Parowan	97	31	63.0	0.50	
Pinto	93	28	60.8	0.45	
Promontory	.....	.....	.....	0.00	
Provo	95	35	63.2	0.18	
Richfield	92	34	63.4	0.07	
St. George	108	37	71.6	0.00	
Scipio	102	28	61.4	0.27	
Smithville	.....	.....	.....	T.	
Snowville	89	25	57.2	0.12	
Soldier Summit	93	20	54.3	0.05	0.5
Terrace	.....	.....	.....	0.00	
Thistle	97	30	62.0	0.05	
Tooele	92	35	63.0	0.72	
Tropic	95	28	58.5	T.	
Vernal	93	34	65.2	0.21	
Wellington	96	31	61.8	0.02	
Vermont.					
Burlington	94	49	69.2	4.70	
Chelsea	93	39	63.6	2.08	
Cornwall	97	41	68.6	2.91	
Enosburg Falls	93	35	65.7	5.35	
Hartland	94	35	63.9	0.89	
Jacksonville	95	35	63.2	1.12	
Manchester	91	38	64.3	2.11	
Norwich	98	34	65.4	1.24	
St. Johnsbury	92	37	65.4	4.07	
Vernon *[e]	96	53	70.0	1.76	
Wells	94	42	66.4	2.41	
Woodstock	94	32	63.4	1.33	
Virginia.					
Alexandria	98	52	74.1	3.50	
Ashland	97	53	75.3	1.40	
Barboursville	95	53	72.8	4.46	
Bedford	97	52	74.5	4.24	
Bigstone Gap	93	50	72.3	5.92	
Birdsnest [i]	.....	.....	70.8	2.80	
Blacksburg	90	41	67.8	6.78	
Bon Air	95	45	73.2	2.61	
Buckingham	98	49	73.8	2.46	
Burkes Garden	86	40	64.9	11.18	
Callaville	93	54	73.8	2.54	
Charlottesville	94	52	72.8	6.64	
Clarksville	.....	.....	.....	1.65	
Cliftonforge	84	50	66.2	4.85	
Columbia	100	52	74.6	10.60	
Dale Enterprise	91	43	68.4	14.37	
Danville	.....	.....	.....	2.11	
Doswell	98	49	74.1	3.14	
Farmville	98	51	75.2	2.20	
Fontella	99	52	74.6	6.84	
Fredericksburg	97	51	73.6	2.56	
Grahams Forge	90[i]	45[i]	69.1[i]	8.32	
Hampton	94	59	74.6	3.22	
Hot Springs	90	45	67.4	6.22	
Lincoln	98	50	70.6	2.62	
Manassas	96	53	72.9	3.25	
Marion	91	46	70.2	9.70	
Newport News	98	61	76.5	3.65	
Quantico	101	51	72.8	.....	
Radford	.....	.....	.....	5.72	
Salem	.....	.....	.....	7.35	
Speers Ferry	.....	.....	.....	4.23	
Spottsville	109	53	73.6	2.60	
Stanardsville	98	50	73.2	2.76	
Staunton	95	48	71.8	4.97	
Stephens City	108	45	72.8	4.23	
Warsaw	95	51	72.4	3.51	
Westpoint	95	50	72.6	3.60	
Williamsburg	97	55	71.2	2.65	
Woodstock	93	45	68.0	6.58	
Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Wytheville	92	45	70.0	7.82	
Washington.					
Aberdeen	85	34	52.3	2.85	
Anacortes	.....	.....	.....	1.40	
Ashford	.....	.....	.....	5.07	T.
Bremerton	88	37	56.6	1.45	
Brinnon	82	38	56.8	2.36	
Buchanan's Farm	.....	.....	.....	1.10	
Cedonia	80	38	53.2	1.39	
Centerville	88	33	54.0	0.55	
Cheney	.....	.....	.....	0.99	
Clearwater	80	38	53.8	4.61	
Cle Elum	89	31	53.2	0.54	
Colfax	89	32	56.9	1.44	
Colville	88	30	54.8	2.05	
Conconully	88	32	56.0	1.06	
Connell	.....	.....	.....	0.75	
Coupeville	.....	.....	.....	1.07	
Crescent	84	29	54.0	1.73	0.2
Dayton	92	29	58.2	0.35	
East Sound	83	33	53.8	0.99	
Ellensburg	86	31	55.0	0.29	
Ellensburg (near)	91	34	58.2	0.27	
Grandmound	87	38	56.6	1.98	
Granite Falls	.....	.....	.....	3.93	
Hooper	93	31	60.0	1.35	
Ilwaco	80	41	55.9	3.63	
Issaquah	.....	.....	.....	2.26	
Lacenter	91	38	56.8	2.50	
Lakeside	86	42	61.6	1.48	
Lind	95	26	60.8	1.46	
Loomis	88	40	61.0	.....	
Monte Cristo	86	31	49.0	8.33	12.0
Mottinger Ranch	96	39	64.9	0.48	
Mount Pleasant	86	39	56.8	3.35	
Moxee Valley	92	30	59.2	1.58	
Northport	96	33	61.2	2.88	
Olga	75	41	54.8	1.83	
Olympia	92	36	56.9	1.04	
Pasco	99	43	67.6	0.25	
Pinehill	95	36	59.8	0.47	
Port Townsend	78	42	54.4	1.34	
Pullman	83	33	55.2	1.34	T.
Republic	.....	.....	.....	3.85	
Renton	.....	.....	.....	1.14	
Ritzville	.....	.....	.....	0.61	
Rosalia	82	32	53.4	1.19	
Sedro	86	34	55.4	2.90	
Silvana [j]	81	44	56.2	1.50	
Snohomish	82	40	55.2	2.92	
Snoqualmie	91	36	54.4	2.89	
Southbend	90	34	54.3	3.28	
Sprague	.....	.....	.....	1.00	
Stampede	.....	.....	.....	4.00	3.0
Sunnyside	91	34	61.0	0.92	
Twin	76	37	52.4	2.23	
Union	90	36	56.0	1.67	
Vancouver	86	40	57.4	1.89	
Vashon	81	42	55.5	1.43	
Waterville	90	32	55.8	1.31	
Wenatchee (near)	88	33	57.8	0.70	
Whatcom	80	35	54.8	2.18	
Wilbur	87	27	53.2	1.47	
West Virginia.					
Beckley	87	45	67.7	4.81	
Beverly	94	39	68.6	6.14	
Bluefield	88	44	68.8	10.87	
Buckhannon	94	40	70.2	4.90	
Burlington	93	39	69.1	5.62	
Byrne	96	45	72.7	7.80	
Camden	90	51	71.6	3.64	
Central	93	42	70.2	4.29	
Chapel	95	50	74.8	8.77	
Charleston	.....	.....	.....	6.92	
Creston	104	40	73.6	7.61	
Dayton	95	39	70 8	2.50	
Echo	96	37	66.8	4.15	
Elkhorn	91	45	70.4	10.82	
Fairmont	.....	.....	.....	5.46	
Glenville	95	44	72.4	5.05	
Grafton	93	40	68.9	9.37	
Green Sulphur	90	43	69.2	4.86	
Harpers Ferry	.....	.....	.....	3.44	
Hinton *a*	.....	.....	.....	6.30	
Hinton *b*	93	48	72.2	6.30	
Huntington	97	42	74.9	5.86	
Josiah	97	43	73.0	5.73	
Lewisburg	90	40	68.5	6.23	
Magnolia	101	40	72.0	1.37	
Mannington	99	41	71.6	3.11	
Marlinton	90	39	66.8	8.77	
Martinsburg	95	46	70.1	5.69	
Morgantown	92	42	70.8	2.34	
Moscow	91	42	69.2	6.53	
New Martinsville	97	45	73.2	3.87	
Nuttallburg	98	48	70.9	7.68	
West Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Oceana	95°	45°	73.4°	8.20	
Oldfields	94	44	70.3	3.35	
Parsons	100	40	68.8	3.37	
Philippi *a*	92	32	65.7	4.58	
Point Pleasant	96	48	74.7	7.29	
Powellton	95	45	72.4	7.16	
Princeton	87	45	68.7	16.30	
Romney	96	41	71.0	1.64	
Rowlesburg	.....	.....	.....	4.30	
Southside	94	50	73.9	7.80	
Spencer	96	43	72.7	11.10	
Wellsburg	90	41	69.6	4.97	
Weston *a*	.....	.....	.....	4.51	
Weston *b*	95	43	72.9	.....	
Wheeling *a*	.....	.....	.....	5.53	
Wheeling *b*	98	50	76.0	6.31	
Williamson	94	49	74.2	7.72	
Winfield	92	47	71.7	7.83	
Wisconsin.					
Amherst	98	34	67.1	3.36	
Antigo	98	31	66.0	.....	
Appleton	92	38	67.4	3.73	
Ashland	.....	.....	.....	8.68	
Barron	94	30	65.0	5.23	
Bayfield	94	40	63.4	5.10	
Beloit	98	38	71.3	1.54	
Brodhead	103	36	72.0	1.43	
Butternut	94	30	62.6	5.03	
Chilton	97	32	67.0	5.76	
Citypoint	98	40	70.5	5.28	
Darlington	96	32	69.2	2.65	
Dodgeville	98	34	68.8	1.02	
Easton	100	32	70.6	9.66	
Eau Claire	96	39	68.8	6.47	
Florence	98	31	63.6	3.51	
Grand River Locks	.....	.....	.....	5.29	
Grantsburg	95	36	65.9	5.26	
Hartland	97	36	68.3	2.76	
Harvey	99	34	68.9	1.75	
Hayward	96	31	65.0	5.38	
Hillsboro	100	33	68.4	4.00	
Koepenick	95	30	63.4	3.00	
Ladysmith	93	29	65.8	5.10	
Lancaster	98	38	70.0	1.30	
Madison	94	42	70.4	2.40	
Manitowoc	85	36	62.1	2.91	
Meadow Valley	99	34	68.0	5.03	
Medford	101	26	66.1	6.65	
Menasha	.....	.....	.....	3.61	
Neillsville	96	32	68.8	4.56	
New Holstein	96	34	66.9	.....	
New London	99	36	67.8	3.92	
North Crandon	95	30	63.7	5.56	
Oconto	95	38	66.1	2.39	
Osceola	93	34	65.3	6.40	
Oshkosh	93°	42°	68.8°	7.60	
Pepin	98	38	72.2	6.90	
Pine River	99	35	67.4	4.02	
Portage	102	39	70.4	1.97	
Port Washington	90	34	63.1	1.44	
Prairie du Chien *a*	102	39	72.4	2.16	
Prairie du Chien *b*	.....	.....	.....	2.60	
Prentice	94	28	64.4	5.50	
Racine	95	37	67.2	2.23	
Shawano	96	35	67.2	3.43	
Sheboygan	90	38	63.8	4.74	
Stevens Point	100	34	67.0	2.87	
Valley Junction	97	34	68.2	9.75	
Viroqua	97	37	68.2	3.22	
Watertown	96	34	69.0	2.26	
Waukesha	97	38	69.0	1.35	
Waupaca	102	37	68.0	3.76	
Wausau	95	33	66.8	3.68	
Wausaukee	99	31	62.2	2.74	
Westbend	93	33	67.2	3.98	
Westfield	99	38	70.0	5.23	
Whitehall	97	36[f]	68.6[f]	3.66	
Wyoming.					
Alcova	94	32	62.8	2.20	
Basin	.....	.....	.....	1.46	
Bitter Creek	82	22	53.4	1.12	
Buffalo	84	31	57.3	2.19	T.
Burlington	88	32	59.6	1.40	
Casper	92	24	61.6	2.99	
Centennial	82	28	54.0	1.30	
Chugwater	92	28	58.6	2.35	
Daniel	78	18	48.4	0.60	
Embar	87	28	56.8	3.04	
Evanston	80	20	52.0	0.22	1.0
Fort Laramie	98	32	63.0	3.43	
Fort Washakie	88	31	59.2	1.70	
Fort Yellowstone	76	20	50.2	1.43	4.0
Fourbear	76	24	49.8	2.29	
Griggs	90	29	58.4	2.02	
Hyattville	92	32	61.0	0.20	T.
Iron Mountain	98	27	59.0	1.62	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Wyoming—Cont'd.	°	°	°	*Ins.*	*Ins.*
Kimball Ranch	88	32	57.0	0.98	
Laramie	85	32	58.6	1.73	2.0
Leo	85	25	56.0	1.48	
Lovell	91	33	60.0	0.29	
Lusk	93	31	59.6	3.70	
Myersville	85	25	55.7	0.32	
Parkman	80	30	55.0	3.92	
Pinebluff	94	28	62.4	2.22	
Rawlins	87	28	57.6	1.06	
Saratoga	92	31	58.2	1.05	
Sheridan	88	32	57.2	2.44	
South Pass City	80	25	53.2	0.96	0.5
Springhill	.....	.....	.....	3.12	
Thayne	81	24	53.2	0.65	
Thermopolis	90	34	61.6	1.64	
Wheatland	94	35	62.9	2.43	
Cuba.					
Aguacate	98	72	84.2	6.30	
Alvarez	.....	.....	.....	5.76	
Anstralia	96	69	81.3	8.87	
Banaguises	96	63	80.0	7.09	
Batabano	101	69	82.4	5.79	
Camajuani	95	64	77.9	7.63	
Cruces	.....	.....	.....	7.27	
Gibara	94	69	81.3	5.35	
Guabairo	.....	.....	.....	8.55	
Guanajay	91	64	77.6	14.58	
Guantanamo	96	69	81.4	2.27	
Guines	93	60	77.6	9.98	
Holguin	98	69	81.1	8.41	
Isabel, Guantanamo	.....	.....	.....	4.00	
Limonar	.....	.....	.....	4.78	
Los Canos	95	62	80.2	1.19	
Magdalena	.....	.....	.....	13.77	
Manzanillo	99	71	84.6	17.52	
Matanzas	96	57	76.8	6.00	
Moron Trocha	96	61	80.6	10.72	
Nuevitas	97	70	83.3	12.29	
Pinar del Rio	96	71	81.4	14.73	
Romelie, Guantanamo	.....	.....	.....	2.54	
San Ceyetano	97	63	81.1	4.65	
Sancti Spiritus	91	71	77.3	16.19	
Santa Clara	98	64	79.4	9.01	
Santa Cruz del Sur	90	70	79.3	10.45	
Soledad	94	69	79.2	6.99	
Soledad, Guantanamo	94	66	80.1	3.60	
Union de Reyes	93	72	81.6	10.66	
Yaguajay	99	69	80.4	11.58	
Yateras	.....	.....	.....	4.01	
Porto Rico.					
Adjuntas	.....	.....	.....	4.26	
Aguirre	90[1]	72[1]	81.7[4]	3.74[4]	
Arecibo	98	69	80.0	4.25	
Barros	.....	.....	.....	4.22	
Bayamon	95	68	80.8	13.18	
Caguas	90	67	78.4	6.49	
Canovanas	92	73	80.8	9.93	
Cayey	97	62	79.3	13.58	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Porto Rico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Cidra	91	60	77.0	6.45	
Coamo	97	68	81.2	4.15	
Comerio	91	65	78.8	5.71	
Corozal	93	66	78.9	4.70	
Fajardo	91	71	81.1	8.10	
Guayama	.....	.....	.....	6.52	
Hacienda Amistad	93	62	79.3	4.84	
Hacienda Perla	89	71	79.9	24.64	
Humacao	89	64	76.6	14.44	
Isabela	89	69	79.6	7.46	
Juana Diaz	98	71	82.2	1.97	
La Isolina	92	66	77.2	10.91	
Manati	94	68	80.4	9.79	
Maunabo	89	73	82.2	11.06	
Mayaguez	95	67	80.7	10.44	
Morovis	95	63	78.1	5.83	
Ponce	93	58	76.4	0.72	
San Lorenzo	90	66	78.8	10.88	
Salvador	88	65	76.2	7.96	
Santa Isabel	93	70	81.4	1.39	
Santurce	.....	.....	.....	8.03	
Vieques	90	75	82.8	5.55	
Yauco	90	69	80.8	1.27	
Mexico.					
Ciudad P. Diaz	102	62	84.8	0.52	
Coatzacoalcos	99	69	82.2	13.61	
Leon de Aldamas	93	56	75.2	1.26	
Puebla	85	54	68.5	4.55	
Tampico	93	73	83.4	5.88	
Vera Cruz	94	71	82.8	10.17	
New Brunswick.					
St. John	77	41	58.1	6.25	
Nicaragua.					
Rivas	89	75	81.9	29.10	
Isthmus of Panama.					
Alhajuela	91	70	77.8	12.01	
La Boca	88	75	81.3	7.05	

Late reports for May, 1901.

Stations.	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Alaska.	°	°	°	*Ins.*	*Ins.*
Coal Harbor	57	22	38.8	0.66	2.2
Fort Liscum	57	27	39.4	1.45	2.0
Juneau	67	33	46.2	3.47	
Kenai	63	23	42.2	0.30	T.
Arizona.					
Bowie *[5]	88	52	75.4	0.18	
Dragoon Summit *[1]	90	48	66.8	0.21	
Gilabend *[1]	106	53	74.0	0.00	
Sentinel *[1]	104	58	75.0	0.00	
Florida.					
Brooksville	91	57	75.4	4.05	
Idaho.					
Oakley	.....	28	.....	0.90	
Michigan.					
St. Johns	83	35	56.8	2.21	T.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Jersey.	°	°	°	*Ins.*	*Ins.*
Billingsport *[1]	84	45	60.1	.....	
New Mexico.					
Aztec	87	33	59.8	0.79	
North Dakota.					
Amenia	93	28	64.2	0.69	
Oregon.					
Forestgrove	90	35	56.8	3.49	
Jacksonville	84	33	57.8	1.28	
Silver Lake	84	17	51.8	0.34	
Vernonia [b]	91	30	53.3	2.23	
Texas.					
Mount Blanco	.....	.....	.....	1.08	
Virginia.					
Petersburg	90	.....	.....	5.12	
West Virginia.					
Philippi	86	21	56.3	5.58	
Wisconsin.					
Lancaster	88	34	58.4	2.92	

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. + 4.
[2] Mean of 8 a. m. + 8 p. m. + 2.
[3] Mean of 7 a. m. + 7 p. m. + 2.
[4] Mean of 6 a. m. + 6 p. m. + 2.
[5] Mean of 7 a. m. + 2 p. m. + 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.
[7] Mean from hourly readings of thermograph.
[8] Mean of sunrise and noon.
[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance "[a]" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

May, 1901, Maine, Kineo, strike out precipitation data. Oregon, Salem *b*, strike out all values and enter: 85 40 56.6 1.79.

TABLE III.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of June, 1901.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	13	25	11	25	s. 49 w.	18
Portland, Me	14	25	12	22	s. 42 w.	15
Northfield, Vt	17	33	6	10	s. 14 w.	16
Boston, Mass	11	24	9	29	s. 57 w.	24
Nantucket, Mass	10	30	10	26	s. 39 w.	26
Block Island, R. I	7	24	15	29	s. 59 w.	22
New Haven, Conn	15	30	12	18	s. 22 w.	16
Middle Atlantic States.						
Albany, N. Y	13	32	7	16	s. 25 w.	21
Binghamton, N. Y†	9	4	12	10	n. 22 e.	5
New York, N. Y	11	27	15	22	s. 24 w.	18
Harrisburg, Pa†	8	4	8	15	n. 60 w.	8
Philadelphia, Pa	11	26	14	33	s. 31 w.	18
Scranton, Pa	19	18	11	28	n. 87 w.	7
Atlantic City, N. J	10	23	13	29	s. 51 w.	21
Cape May, N. J	18	27	15	19	s. 16 w.	15
Baltimore, Md	12	24	22	18	s. 18 e.	13
Washington, D. C	15	29	13	17	s. 16 w.	15
Lynchburg, Va	13	16	16	26	s. 73 w.	11
Norfolk, Va	11	32	19	10	s. 23 e.	23
Richmond, Va	14	29	16	18	s. 8 w.	15
South Atlantic States.						
Charlotte, N. C	8	31	18	11	s. 17 e.	24
Hatteras, N. C	13	29	18	12	s. 21 e.	17
Raleigh, N. C	14	28	12	21	s. 33 w.	17
Wilmington, N. C	7	33	14	21	s. 15 w.	27
Charleston, S. C	13	24	17	17	s.	11
Augusta, Ga	13	25	13	21	s. 34 w.	14
Savannah, Ga	13	23	16	20	s. 22 w.	11
Jacksonville, Fla	10	16	32	12	s. 73 e.	21
Florida Peninsula.						
Jupiter, Fla	8	25	29	13	s. 43 e.	23
Key West, Fla	8	17	34	1	s. 75 e.	34
Tampa, Fla	18	11	36	10	n. 75 e.	27
Eastern Gulf States.						
Atlanta, Ga	17	20	14	22	s. 69 w.	8
Macon, Ga†	9	12	8	5	s. 45 e.	4
Pensacola, Fla†	13	8	14	3	n. 66 e.	12
Mobile, Ala	28	22	14	6	n. 53 e.	10
Montgomery, Ala	16	25	15	15	s.	9
Meridian, Miss†	10	11	6	9	s. 72 w.	3
Vicksburg, Miss	12	23	29	12	s. 57 e.	20
New Orleans, La	10	30	29	8	s. 46 e.	29
Western Gulf States.						
Shreveport, La	12	23	31	12	s. 60 e.	22
Fort Smith, Ark	9	20	35	4	s. 59 e.	36
Little Rock, Ark	10	31	15	16	s. 3 w.	21
Corpus Christi, Tex	2	41	34	2	s. 39 e.	50
Fort Worth, Tex	3	44	22	7	s. 20 e.	44
Galveston, Tex	6	39	27	3	s. 36 e.	41
Palestine, Tex	7	38	14	13	s. 2 e.	31
San Antonio, Tex	3	34	39	2	s. 50 e.	48
Ohio Valley and Tennessee.						
Chattanooga, Tenn	16	27	9	26	s. 57 w.	20
Knoxville, Tenn	20	17	14	22	n. 69 w.	8
Memphis, Tenn	13	30	10	20	s. 30 w.	20
Nashville, Tenn	16	18	14	24	s. 79 w.	10
Lexington, Ky†	5	16	7	10	s. 15 w.	11
Louisville, Ky	20	25	14	12	s. 22 e.	5
Evansville, Ind†	8	15	9	6	s. 23 e.	8
Indianapolis, Ind	18	27	11	22	s. 51 w.	14
Cincinnati, Ohio	12	27	19	16	s. 11 e.	15
Columbus, Ohio	6	26	20	19	s. 3 e.	20
Pittsburg, Pa	17	18	12	24	s. 85 w.	12
Parkersburg, W. Va	12	31	18	10	s. 23 e.	21
Elkins, W. Va	16	28	10	22	s. 45 w.	17
Lower Lake Region.						
Buffalo, N. Y	3	27	12	31	s. 39 w.	31
Oswego, N. Y	7	27	13	25	s. 31 w.	23
Rochester, N. Y	9	26	11	31	s. 50 w.	26
Erie, Pa	8	18	12	31	s. 62 w.	22
Cleveland, Ohio	11	27	19	15	s. 14 e.	16
Sandusky, Ohio	7	18	19	23	s. 20 w.	12
Toledo, Ohio	12	21	16	25	s. 45 w.	13
Detroit, Mich	12	21	17	25	s. 42 w.	12
Upper Lake Region.						
Alpena, Mich	6	21	26	14	s. 39 e.	17
Escanaba, Mich	16	28	17	11	s. 27 e	13
Grand Haven, Mich	5	28	14	23	s. 21 w.	24
Houghton, Mich.†	5	4	14	11	n. 7 e.	3
Marquette, Mich	18	21	13	21	s. 69 w.	8
Port Huron, Mich	13	23	13	24	s. 48 w.	15
Sault Ste. Marie, Mich	9	16	26	21	s. 36 e.	9
Chicago, Ill	11	22	22	18	s. 20 e.	12
Milwaukee, Wis.	20	22	20	19	s. 27 e.	2
Green Bay, Wis	13	24	18	20	s. 10 w.	11
Duluth, Minn	32	5	26	18	n. 17 e.	28
North Dakota.						
Moorhead, Minn	19	20	21	18	s. 72 e.	3
Bismarck, N. Dak	27	7	16	23	n. 19 w.	21
Williston, N. Dak	24	8	11	27	n. 56 w.	19
Upper Mississippi Valley.						
St. Paul, Minn	8	32	17	16	s. 2 e.	24

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Mississippi Valley.—Cont'd.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
La Crosse, Wis†	3	19	7	8	s. 3 w.	16
Davenport, Iowa	6	24	23	17	s. 18 e.	19
Des Moines, Iowa	8	30	16	24	s. 20 w.	23
Dubuque, Iowa	10	30	24	12	s. 31 e.	23
Keokuk, Iowa	10	28	19	20	s. 3 w.	18
Cairo, Ill	11	31	11	23	s. 31 w.	23
Springfield, Ill	9	28	19	21	s. 6 w.	20
Hannibal, Mo†	5	14	9	8	s. 6 e.	9
St. Louis, Mo	10	28	14	16	s. 6 w.	18
Missouri Valley.						
Columbia, Mo*	3	16	9	6	s. 14 e.	12
Kansas City, Mo	13	34	15	10	s. 13 e.	22
Springfield, Mo	6	31	18	12	s. 2 e.	25
Lincoln, Nebr	7	35	24	8	s. 30 e.	32
Omaha, Nebr	11	25	15	6	s. 33 e.	17
Valentine, Nebr	17	19	15	18	s. 56 w.	4
Sioux City, Iowa†	5	15	8	8	s.	10
Pierre, S. Dak	15	18	20	20	s.	8
Huron, S. Dak	12	18	27	17	s. 59 e.	12
Yankton, S. Dak†	4	9	11	11	s.	5
Northern Slope.						
Havre, Mont	17	16	15	32	n. 87 w.	17
Miles City, Mont	25	9	14	24	n. 32 w.	19
Helena, Mont	6	25	2	35	s. 60 w.	38
Kalispell, Mont	10	17	16	29	s. 62 w.	15
Rapid City, S. Dak	26	10	12	25	n. 39 w.	21
Cheyenne, Wyo	23	16	11	24	n. 62 w.	15
Lander, Wyo	16	17	8	34	s. 88 w.	26
North Platte, Nebr	11	25	23	17	s. 23 e.	15
Middle Slope.						
Denver, Colo	17	27	10	20	s. 45 w.	14
Pueblo, Colo	21	15	15	22	n. 49 w.	9
Concordia, Kans	4	37	18	6	s. 12 e.	35
Dodge, Kans	8	54	29	5	s. 43 e.	85
Wichita, Kans	6	49	10	1	s. 12 e.	44
Oklahoma, Okla	3	42	19	4	s. 21 e.	42
Southern Slope.						
Abilene, Tex	4	40	34	2	s. 42 e.	48
Amarillo, Tex	3	45	14	14	s.	42
Southern Plateau.						
El Paso, Tex	17	10	21	27	n. 56 w.	7
Santa Fe, N. Mex	12	23	25	16	s. 39 e.	14
Flagstaff, Ariz	14	23	4	36	s. 74 w.	33
Phoenix, Ariz	16	8	25	21	n. 27 e.	9
Yuma, Ariz	5	33	8	25	s. 31 w.	33
Independence, Cal	26	10	7	28	n. 58 w.	26
Middle Plateau.						
Carson City, Nev	12	17	2	42	s. 83 w.	40
Winnemucca, Nev	22	13	14	28	n. 57 w.	17
Modena, Utah	9	14	6	41	s. 83 w.	41
Salt Lake City, Utah	31	9	17	14	n. 8 e.	22
Grand Junction, Colo	14	24	14	15	s. 6 w.	10
Northern Plateau.						
Baker City, Oreg	23	23	9	14	w.	5
Boise, Idaho	23	15	10	30	n. 68 w.	22
Lewiston, Idaho†	2	5	22	4	s. 81 e.	18
Pocatello, Idaho	7	21	7	37	s. 65 w.	33
Spokane, Wash	5	34	14	22	s. 15 w.	30
Walla Walla, Wash	9	37	3	19	s. 30 w.	32
North Pacific Coast Region.						
Astoria, Oreg	20	17	3	38	n. 85 w.	35
Neah Bay, Wash	4	15	8	43	s. 73 w.	37
Port Crescent, Wash*	0	4	3	26	s. 80 w.	24
Seattle, Wash	17	24	19	15	s. 30 e.	8
Tacoma, Wash	16	26	1	29	s. 70 w.	30
Portland, Oreg	19	16	3	35	n. 85 w.	32
Roseburg, Oreg	28	1	10	24	n. 27 w.	30
Middle Pacific Coast Region.						
Eureka, Cal	37	4	3	32	n. 42 w.	44
Mount Tamalpais, Cal	30	1	3	42	n. 53 w.	49
Red Bluff, Cal	37	13	16	5	n. 25 e.	20
Sacramento, Cal	9	33	7	22	s. 32 w.	28
San Francisco, Cal	0	14	0	53	s. 75 w.	55
South Pacific Coast Region.						
Fresno, Cal	40	0	2	42	n. 45 w.	57
Los Angeles, Cal	7	16	11	36	s. 70 w.	27
San Diego, Cal	16	22	5	31	s. 77 w.	27
San Luis Obispo, Cal	16	14	2	30	n. 86 w.	28
West Indies.						
Basseterre, St. Kitts Island	13	6	52	0	n. 83 e.	52
Bridgetown, Barbados	11	11	51	0	e.	51
Cienfuegos, Cuba						
Grand Turk, Turks Island, W. I†	0	14	24	0	s. 60 e.	28
Havana, Cuba	11	7	52	0	n. 86 e.	54
Kingston, Jamaica	38	7	21	6	n. 26 e.	34
Port of Spain, Trinidad	12	7	43	7	n. 82 e.	36
Puerto Principe, Cuba	9	10	42	6	s. 88 e.	36
Roseau, Dominica, W. I	21	10	38	5	n. 72 e.	35
San Juan, Porto Rico	1	16	51	1	s. 73 e.	52
Santiago de Cuba, Cuba	20	21	25	9	s. 87 e.	16
Santo Domingo, S. Domingo, W. I.						
Willemstad, Curaçao	3	5	57	0	s. 88 e.	57

*From observations at 8 p. m. only.

†From observations at 8 a. m. only.

TABLE IV.—*Thunderstorms and auroras, June*, 1901.

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	52	T.	1	2	6	1	8	7	....	....	4	3	7	1	1	1	2	1	3	....	1	....	....	1	5	8	3	7	6	3	10	7	....	99	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arizona	56	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	1	....	....	....	....	1	1	....	....	1	....	6	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arkansas	57	T.	....	1	....	1	2	9	1	6	3	....	7	5	5	....	....	1	1	3	2	....	....	....	3	4	3	....	8	6	5	6	....	82	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
California	167	T.	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	3	....	....	....	....	....	....	....	....	....	....	....	....	5	3	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Colorado	81	T.	5	9	6	5	2	....	8	....	....	4	10	2	5	21	10	....	1	10	1	2	3	1	....	....	1	3	2	1	4	5	....	121	24	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Connecticut	21	T.	....	1	....	1	....	1	1	....	....	....	1	....	....	11	1	....	....	....	....	....	....	11	9	1	....	....	8	1	4	....	....	51	13	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Delaware	5	T.	1	1	....	1	..	....	....	....	....	1	1	....	2	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	8	7	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Dist. of Columbia	4	T.	1	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	1	....	....	6	6	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Florida	47	T.	8	3	8	4	1	6	5	3	4	5	3	5	5	5	5	7	5	7	5	2	3	4	3	2	1	6	7	1	3	6	....	132	30	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Georgia	55	T.	2	1	5	....	2	15	...	....	....	4	4	6	6	6	3	6	10	3	....	....	....	6	4	4	12	2	9	4	12	5	....	131	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Idaho	34	T.	1	2	1	....	....	....	....	....	1	2	1	....	....	....	....	....	1	2	8	2	....	....	....	..	....	....	....	....	1	....	....	22	11	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Illinois	92	T.	5	7	2	10	47	9	....	6	11	22	5	16	14	15	21	10	....	13	26	25	25	15	12	12	20	24	26	27	10	3	....	438	28	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Indiana	58	T.	....	7	5	1	22	18	....	....	....	5	....	22	13	9	8	6	8	1	23	17	20	5	10	....	...	8	14	14	1	....	....	237	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Indian Territory	11	T.	....	....	....	4	....	....	3	7	....	....	....	....	....	....	....	1	2	3	2	....	....	....	....	....	....	....	....	....	....	....	....	22	7	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Iowa	149	T.	1	8	6	17	39	4	6	6	35	26	6	14	4	12	17	9	8	11	26	11	45	13	7	....	....	3	17	27	15	...	....	393	28	T.
		A.	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Kansas	77	T.	....	....	15	10	2	4	17	15	3	....	4	22	3	1	3	....	6	22	14	3	6	2	...	....	....	....	5	3	5	....	....	165	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Kentucky	41	T.	....	5	1	1	5	6	....	....	....	....	1	10	4	2	6	2	3	....	1	6	12	2	3	2	16	5	5	4	....	6	....	108	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Louisiana	46	T.	....	5	3	12	10	5	7	3	....	4	2	1	....	...	3	4	1	3	...	...	....	....	3	4	10	4	5	13	14	8	....	124	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Maine	19	T.	....	....	5	2	....	....	1	....	....	....	....	....	....	1	....	....	..	....	....	....	....	1	4	1	....	1	5	11	5	...	....	37	11	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Maryland	48	T.	7	11	5	....	2	17	4	....	....	...	2	5	19	1	2	2	....	1	....	9	9	13	3	1	4	13	8	3	1	..	....	142	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Massachusetts	48	T.	....	1	....	9	....	2	....	....	....	....	....	....	....	1	....	....	....	....	....	....	6	28	25	....	....	....	....	....	....	3	....	....	75	8	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Michigan	106	T.	2	3	....	....	17	1	1	....	....	8	22	15	20	10	2	6	15	7	6	5	10	10	...	26	28	3	9	20	15	9	....	270	25	T.
		A.	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
Minnesota	67	T.	....	....	10	9	16	2	....	1	7	7	16	13	2	12	25	17	6	1	3	4	25	4	17	20	9	4	18	26	13	18	....	305	27	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Mississippi	44	T.	1	4	5	5	6	8	1	....	2	1	7	4	....	....	....	....	4	....	....	1	....	....	....	7	5	5	14	16	10	8	....	114	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Missouri	95	T.	....	5	1	21	30	11	4	10	14	11	7	21	8	4	1	3	2	5	18	7	6	23	6	8	6	4	9	8	4	2	....	259	29	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Montana	40	T.	2	3	3	1	2	...	....	2	2	1	5	2	4	1	3	1	2	6	7	11	2	2	11	3	5	....	....	....	3	1	....	85	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	A.
Nebraska	142	T.	4	3	32	31	12	....	27	12	19	9	17	29	21	19	28	5	23	27	25	12	17	11	1	....	....	1	5	9	1	3	....	403	27	T.
		A.	..	....	....	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	3	A.
Nevada	40	T.	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	3	8	1	....	....	....	....	2	....	....	....	....	....	....	....	17	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New Hampshire	19	T.	....	....	4	2	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	1	3	6	10	1	....	1	....	2	5	....	....	38	13	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New Jersey	51	T.	4	18	3	....	....	2	12	1	....	....	....	....	1	....	....	....	....	....	1	....	11	7	14	2	....	....	5	2	5	....	....	88	15	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	2	2	A.
New Mexico	31	T.	3	1	....	....	....	1	....	.	....	....	....	....	....	2	....	....	4	5	....	1	5	1	....	....	4	2	4	....	5	3	....	41	14	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New York	99	T.	7	44	3	....	....	31	9	1	1	....	....	1	4	8	2	....	....	6	14	30	7	51	30	....	6	7	7	13	17	1	....	300	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
North Carolina	56	T.	1	1	10	3	6	8	3	1	....	1	4	4	4	8	7	11	10	4	6	11	7	16	16	18	17	11	4	7	13	18	....	230	29	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
North Dakota	48	T.	1	2	4	1	1	....	2	3	1	3	4	3	2	1	6	1	....	....	1	1	2	2	4	7	3	1	2	5	....	3	....	66	26	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Ohio	128	T.	6	25	....	....	30	20	2	....	....	....	38	15	40	3	20	16	25	5	27	43	37	39	32	19	39	11	9	23	4	6	....	534	25	T.
		A.	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
Oklahoma	23	T.	1	1	2	1	....	1	1	5	2	....	....	2	....	....	....	....	1	5	2	1	....	....	....	....	....	....	1	....	....	....	....	26	14	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Oregon	74	T.	3	....	....	....	....	....	....	....	....	5	1	....	....	....	....	2	2	5	6	1	....	....	1	....	....	....	....	....	....	....	....	....	26	9	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Pennsylvania	91	T.	5	25	1	....	2	3	7	....	..	....	5	5	6	5	6	1	2	3	6	19	17	19	9	....	4	13	20	15	5	1	....	204	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Rhode Island	7	T.	....	...	....	3	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	5	4	....	....	....	....	....	....	....	....	13	4	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
South Carolina	46	T.	....	....	9	....	....	10	....	....	2	2	3	....	1	10	10	15	4	2	1	4	7	10	3	10	16	10	2	2	7	18	....	158	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
South Dakota	56	T.	2	12	13	7	8	1	4	5	14	8	16	9	13	16	19	3	1	1	10	15	12	1	4	....	4	2	4	3	2	4	....	213	29	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Tennessee	56	T.	....	....	1	....	2	6	1	....	3	6	7	10	3	5	6	6	7	....	1	2	6	2	1	4	8	4	9	7	12	6	....	125	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Texas	95	T.	1	4	1	4	5	....	2	....	1	...	1	....	1	1	1	....	3	2	....	..	1	1	....	....	..	2	1	....	1	....	....	33	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Utah	47	T.	....	3	1	4	....	2	1	....	....	....	1	....	4	....	....	....	....	2	1	1	....	....	....	....	....	....	....	....	....	2	....	....	22	11	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Vermont	16	T.	....	5	4	6	....	8	1	....	....	....	....	....	....	1	....	....	....	....	....	6	2	4	5	....	....	....	....	5	5	....	....	52	12	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Virginia	50	T.	2	5	10	....	1	7	2	....	....	....	....	4	5	1	8	2	3	....	....	10	10	7	6	2	1	4	4	9	13	12	....	128	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Washington	64	T.	7	....	....	1	1	2	....	2	2	4	3	2	3	....	....	....	....	1	4	1	....	1	....	1	....	....	2	....	....	....	....	37	16	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
West Virginia	43	T.	2	10	2	....	6	11	...	....	....	....	8	9	12	3	9	12	8	3	2	8	6	15	10	3	12	12	3	8	5	4	....	183	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Wisconsin	60	T.	....	....	....	10	21	3	....	....	3	18	18	16	7	7	2	20	2	5	1	....	10	2	2	11	2	1	17	19	20	11	....	228	24	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Wyoming	31	T.	3	8	7	3	....	....	3	2	..	3	5	....	3	3	2	1	3	7	6	3	1	2	....	....	2	....	....	....	....	1	...	68	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Sums	2,893	T.	89	346	194	191	308	244	137	91	134	158	246	278	246	208	239	171	176	185	268	276	335	345	277	183	241	175	275	317	261	176	....	6,670	....	T.
		A.	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	....	8	....	A.

TABLE V.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during June, 1901, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration.		Total am't of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated.												
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	22	3.34 a. m.	7.38 a. m.	1.08	3.54 a. m.	4.30 a. m.	0.03	0.25	0.56	0.60	0.68	0.75	0.81	0.96	0.99	1.00	.....	.....	.....	.....	.....
Alpena, Mich.	5	.....	.....	0.23	.....	.....	.....	.....	0.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlanta, Ga.	25	5.35 p. m.	8.50 p. m.	1.05	5.45 p. m.	6.25 p. m.	0.01	0.08	0.26	0.50	0.59	0.70	0.81	0.91	0.95	0.98	.....	.....	.....	.....	.....
Atlantic City, N. J.	7	.....	.....	0.56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.26	.....	.....	.....
Baltimore, Md.	15	.....	.....	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.16	.....	.....	.....
Binghamton, N. Y.	7	7.30 a. m.	12.16 p. m.	0.78	8.05 a. m.	8.25 a. m.	0.07	0.12	0.30	0.40	0.44	0.46	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bismarck, N. Dak.	13	8.55 p. m.	D. N.	1.34	10.05 p. m.	10.43 p. m.	0.05	0.46	0.71	0.95	1.00	1.05	1.10	1.12	1.20	.....	.....	.....	.....	.....	.....
Boise, Idaho	22	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston, Mass.	22	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.35	.....	.....	.....
Buffalo, N. Y.	26	.....	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.30	.....	.....	.....
Cairo, Ill.	4-5	10.48 p. m.	2.30 a. m.	0.83	1.35 a. m.	2.13 a. m.	0.14	0.08	0.26	0.38	0.43	0.46	0.49	0.63	0.69	.....	.....	.....	.....	.....	.....
Charleston, S. C.	13	.....	.....	1.81	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.50	.....	.....	.....
Chicago, Ill.	5	4.43 p. m.	8.09 p. m.	0.92	5.22 p. m.	5.52 p. m.	T.	0.29	0.46	0.63	0.70	0.79	0.88	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati, Ohio	15	.....	.....	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....	.....	.....	.....	.....
Cleveland, Ohio	20	.....	.....	1.31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.53	.....	.....	.....
Columbia, Mo.	5-6	.....	.....	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....
Columbus, Ohio	16	4.35 p. m.	5.55 p. m.	0.63	5.15 p. m.	5.30 p. m.	0.02	0.09	0.35	0.52	0.54	0.56	0.60	.....	.....	.....	.....	.....	.....	.....	.....
Do	23	D. N.	D. N.	2.30	1.55 a. m.	2.45 a. m.	0.01	0.09	0.18	0.61	1.07	1.49	1.74	1.94	2.06	2.10	2.15	.....	.....	.....	.....
Do	24	6.15 p. m.	6.56 p. m.	0.72	6.20 p. m.	6.55 p. m.	0.01	0.09	0.16	0.20	0.29	0.39	0.61	0.71	.....	.....	.....	.....	.....	.....	.....
Denver, Colo.	14-15	.....	.....	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.37	.....	.....	.....
Des Moines, Iowa	21	.....	.....	0.43	.....	.....	.....	.....	.....	.....	.....	.....	0.43	.....	.....	.....	.....	.....	.....	.....	.....
Detroit, Mich.	20	.....	.....	0.79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.55	.....	.....	.....
Dodge, Kans	7	.....	.....	1.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.80†	.....	.....	.....
Duluth, Minn.	28	5.10 p. m.	6.20 p. m.	1.13	5.55 p. m.	6.15 p. m.	0.15	0.34	0.74	0.89	0.94	0.98	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastport, Me.	23-24	6.40 p. m.	3.25 a. m.	3.30	9.15 p. m.	10.12 p. m.	0.78	0.07	0.11	0.18	0.25	0.33	0.42	0.45	0.49	0.56	0.67	0.85	.....	.....	.....
Elkins, W. Va.	13	12.38 p. m.	1.25 p. m.	0.64	12.40 p. m.	1.10 p. m.	T	0.06	0.30	0.44	0.52	0.58	0.62	0.63	0.64	.....	.....	.....	.....	.....	.....
Do	26	2.30 p. m.	3.38 p. m.	0.74	2.56 p. m.	3.05 p. m.	0.01	0.35	0.63	0.70	0.72	0.73	.....	.....	.....	.....	.....	.....	.....	.....	.....
Erie, Pa.	13	.....	.....	0.53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.42	.....	.....	.....
Escanaba, Mich.	22	2.20 a. m.	7.52 a. m.	0.86	2.42 a. m.	3.05 a. m.	0.02	0.10	0.30	0.46	0.72	0.82	0.83	.....	.....	.....	.....	.....	.....	.....	.....
Evansville, Ind	26	.....	.....	1.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.57	.....	.....	.....
Fort Worth, Tex.	26	.....	.....	0.27	.....	.....	.....	.....	.....	.....	0.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fresno, Cal.	12	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*	.....	.....	.....
Galveston, Tex.	5	.....	.....	0.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Junction, Colo.	14	.....	.....	0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.27	.....	.....	.....
Harrisburg, Pa.	6-7	.....	.....	0.72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.25	.....	.....	.....
Hatteras, N. C.	17	3.45 a. m.	9.00 a. m.	2.49	3.50 a. m. 4.40 a. m.	4.40 a. m. 5.35 a. m.	0.02	0.15 0.95	0.33 1.01	0.49 1.02	0.58 1.06	0.61 1.26	0.62 1.58	0.62 1.82	0.63 1.88	0.81 1.88	0.90 1.99	.....	.....	.....	.....
Huron, S. Dak.	13-14	10.45 p. m.	D. N.	0.75	11.35 p. m.	11.50 p. m.	0.04	0.07	0.23	0.41	0.44	0.46	.....	.....	.....	.....	.....	2.12	2.21	.....	.....
Do	14-15	9.08 p. m.	D. N.	1.61	12.05 a. m.	12.35 a. m.	T.	0.15	0.91	1.00	1.18	1.31	1.36	1.37	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind.	22-23	11.40 p. m.	D. N.	1.32	12.02 a. m.	12.15 a. m.	0.02	0.22	0.47	0.54	0.56	0.58	0.64	0.68	.....	.....	.....	.....	.....	.....	.....
Jacksonville, Fla.	14	3.50 p. m.	6.10 p. m.	3.22	4.40 p. m.	5.35 p. m.	0.02	0.17	0.62	1.22	1.59	1.74	1.77	2.17	2.59	2.80	2.96	3.11	.....	.....	.....
Jupiter, Fla.	10-13	10.00 p. m.	7.00 a. m.	11.45	‡ § ‖	‡ § ‖	1.53 3.74 7.52	0.13 0.11 0.15	0.30 0.18 0.26	0.40 0.25 0.35	0.46 0.37 0.45	0.63 0.43 0.61	0.67 0.47 0.95	0.78 0.49 1.27	0.88 0.54 1.42	0.98 0.58 1.57	1.06 0.65 1.77	1.20 0.90 2.20	1.38 ..... 2.53	1.67 ..... 2.72	.....
Kalispell, Mont	20	.....	.....	0.36	.....	.....	.....	.....	.....	.....	.....	0.33	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City, Mo.	22	6.20 p. m.	7.58 p. m.	1.76	6.45 p. m.	7.45 p. m.	0.04	0.05	0.23	0.55	0.74	0.91	1.13	1.20	1.24	1.33	1.51	1.70	.....	.....	.....
Key West, Fla.	12	.....	.....	0.69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.69	.....	.....	.....
Knoxville, Tenn	21	4.30 a. m.	1.45 p. m.	2.09	6.30 a. m.	7.25 a. m.	0.22	0.06	0.08	0.11	0.18	0.20	0.22	0.23	0.40	0.60	0.68	0.76	.....	.....	.....
Lexington, Ky.	25	5.00 p. m.	5.40 p. m.	0.53	5.05 p. m.	5.15 p. m.	T.	0.24	0.52	0.53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lincoln, Nebr.	3	9.04 p. m.	11.30 p. m.	0.61	9.20 p. m.	9.40 p. m.	T.	0.24	0.38	0.48	0.54	0.56	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Rock, Ark.	8	.....	.....	0.79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.48	.....	.....	.....
Los Angeles, Cal.	2	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisville, Ky*	20-21	.....	.....	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.25†	.....	.....	.....
Macon, Ga.	27	1.13 p. m.	2.30 p. m.	0.91	1.20 p. m.	2.05 p. m.	0.01	0.05	0.25	0.42	0.43	0.43	0.43	0.52	0.78	0.87	0.89	0.90	.....	.....	.....
Memphis, Tenn.	16	8.00 p. m.	8.27 p. m.	0.45	8.00 p. m.	8.10 p. m.	0.00	0.16	0.41	0.43	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Meridian, Miss.	2	7.10 p. m.	9.20 p. m.	1.31	7.13 p. m.	7.40 p. m.	0.01	0.27	0.34	0.44	0.71	0.92	0.95	.....	.....	.....	.....	.....	.....	.....	.....
Milwaukee, Wis.	16	.....	.....	0.44	.....	.....	.....	.....	.....	.....	.....	.....	0.44	.....	.....	.....	.....	.....	.....	.....	.....
Montgomery, Ala.	5	.....	.....	0.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.42	.....	.....	.....
Nantucket, Mass.	7-8	.....	.....	0.56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.40	.....	.....	.....
Nashville, Tenn.	6	.....	.....	0.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.10	.....	.....	.....	.....	.....	.....	.....
New Haven, Conn.	7	.....	.....	0.21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.07	.....	.....	.....
New Orleans, La.	4	4.00 p. m.	6.30 p. m.	1.52	5.25 p. m.	6.05 p. m.	0.45	0.13	0.37	0.51	0.57	0.65	0.81	0.95	1.03	1.04	1.06	.....	.....	.....	.....
Do	29	12.14 p. m.	2.55 p. m.	1.96	1.03 p. m.	1.25 p. m.	0.88	0.12	0.20	0.40	0.55	0.60	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York, N. Y.	7	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....
Norfolk, Va.	3	6.25 p. m.	11.45 p. m.	1.99	6.30 p. m. 7.47 p. m.	6.50 p. m. 8.45 p. m.	0.01 0.57	0.14 0.16	0.29 0.26	0.42 0.41	0.50 0.52	0.53 0.54	0.59	0.71	0.73	0.79	0.85	0.96	1.10	1.20	.....
Northfield, Vt.	20-21	1.05 p. m.	D. N.	1.29	1.10 p. m.	1.27 p. m.	0.03	0.16	0.28	0.56	0.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma, Okla.	8	12.53 a. m.	6.00 a. m.	1.07	12.53 a. m.	1.05 a. m.	0.00	0.39	0.62	0.67	0.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	19-20	11.30 p. m.	2.30 a. m.	0.55	12.20 a. m.	12.35 a. m.	0.04	0.05	0.23	0.46	0.47	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Omaha, Nebr.	4	7.02 p. m.	7.45 p. m	0.50	7.10 p. m.	7.25 p. m.	T.	0.09	0.20	0.45	0.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkersburg, W. Va.	13	5.55 p. m.	7.51 p. m.	1.85	6.10 p. m.	6.45 p. m.	T.	0.10	0.23	0.46	0.75	0.96	1.35	1.56	1.66	1.71	.....	.....	.....	.....	.....
Do	25	D. N.	2.33 a. m.	0.82	1.15 a. m.	1.40 a. m.	0.02	0.22	0.45	0.52	0.58	0.66	0.68	.....	.....	.....	.....	.....	.....	.....	.....
Do	26	7.50 p. m.	8.40 p. m.	1.70	7.50 p. m.	8.20 p. m.	0.00	0.13	0.49	0.90	1.21	1.53	1.65	1.67	1.69	.....	.....	.....	.....	.....	.....
Philadelphia, Pa.	7	.....	.....	0.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.34	.....	.....	.....
Pittsburg, Pa.	22	2.10 p. m.	3.15 p. m.	1.04	2.20 p. m.	2.50 p. m.	0.02	0.16	0.32	0.45	0.67	0.82	0.95	0.97	1.00	.....	.....	.....	.....	.....	.....
Pocatello, Idaho	2	.....	.....	0.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.07	.....	.....	.....
Portland, Me.	23	.....	.....	0.21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.20	.....	.....	.....
Portland, Oreg.	25	.....	.....	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.14	.....	.....	.....
Pueblo, Colo.	14	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.44	.....	.....	.....
Raleigh, N. C.	23-24	11.40 p. m.	2.40 a. m.	0.98	1.30 a. m.	1.47 a. m.	0.12	0.30	0.56	0.77	0.84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richmond, Va.	3	4.54 p. m.	8.40 p. m.	1.26	4.55 p. m.	5.35 p. m.	T.	0.08	0.12	0.30	0.56	0.71	0.93	1.03	1.07	.....	.....	.....	.....	.....	.....
Rochester, N. Y.	20	.....	.....	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....
St. Louis, Mo.	4	5.55 p. m.	11.56 p. m.	2.29	6.45 p. m. 11.35 p. m.	8.25 p. m. 11.50 p. m.	0.27 1.65	0.09 0.25	0.22 0.50	0.33 0.65	0.49	0.51	0.53	0.58	0.67	0.75	0.80	0.82	0.84	1.33	.....
St. Paul, Minn.	14	3.17 p. m.	4.10 p. m.	1.02	3.30 p. m.	3.50 p. m.	T.	0.18	0.36	0.70	1.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	28	4.15 p. m.	5.25 p. m.	1.46	4.48 p. m.	5.18 p. m.	T.	0.27	0.45	0.60	0.90	1.25	1.45	.....	.....	.....	.....	.....	.....	.....	.....
Salt Lake City, Utah	12-13	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.15	.....	.....	.....
San Diego, Cal.	2	.....	.....	0.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sandusky, Ohio	17	1.25 p. m.	2.40 p. m.	0.98	1.39 p. m.	2.00 p. m.	0.01	0.36	0.56	0.77	0.92	0.95	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Cal.	18	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savannah, Ga.	17	D. N.	D. N.	1.59	1.34 a. m.	1.55 a. m.	0.05	0.30	0.57	0.86	0.92	0.92	0.95	1.08	1.14	1.22	1.29	1.40	.....	.....	.....
Seattle, Wash.	25-26	.....	.....	0.77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.41	.....	.....	.....
Spokane, Wash.	12	.....	.....	0.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.08	.....	.....	.....
Springfield, Ill.	26	8.15 a. m.	1.30 p. m.	1.49	9.45 a. m.	11.05 a. m.	0.03	0.06	0.13	0.19	0.29	0.36	0.46	0.56	0.62	0.65	0.69	0.75	1.16	.....	.....
Tampa, Fla.	1-2	8.10 p. m.	6.10 p. m.	1.91	11.35 p. m.	11.55 p. m.	0.20	0.10	0.31	0.47	0.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Toledo, Ohio	11	11.53 a. m.	12.25 p. m.	0.60	11.55 a. m.	12.10 p. m.	T.	0.16	0.38	0.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	24	9.10 p. m.	D. N.	1.12	9.18 p. m.	9.50 p. m.	T.	0.20	0.42	0.45	0.53	0.72	0.94	1.01	1.04	.....	.....	.....	.....	.....	.....
Topeka, Kans.	12	.....	.....	0.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.36	.....	.....	.....
Vicksburg, Miss.	5-6	.....	.....	1.97	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.69	.....	.....	.....
Washington, D. C.	13	1.05 p. m.	1.50 p. m.	1.28	1.08 p. m.	1.38 p. m.	T.	0.26	0.53	0.67	1.00	1.18	1.27	.....	.....	.....	.....	.....	.....	.....	.....

TABLE V.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total am't of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time as indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Wilmington, N. C.	17	1.35 p.m.	9.10 p.m.	2.44	2.35 p.m.	3.30 p.m.	0.20	0.09	0.16	0.36	0.52	0.64	0.85	1.03	1.25	1.42	1.53	1.64	.....	.....	.....
Do	24	D. N.	D. N.	1.95	3.00 a.m.	4.20 a.m.	0.09	0.05	0.16	0.32	0.57	0.88	0.98	1.01	1.01	1.02	1.07	1.28	1.67	.....	.....
Yankton, S. Dak	15	3.55 p.m.	4.55 p.m.	1.10	4.15 p.m.	4.45 p.m.	0.09	0.21	0.39	0.51	0.71	0.86	0.98	1.00	.....	.....	.....	.....	.....	.....	.....
Basseterre, St. Kitts	24	6.35 p.m.	7.00 p.m.	0.53	6.37 p.m.	6.55 p.m.	T.	0.31	0.46	0.50	0.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	24-25	10.00 p.m.	D. N.	1.67	10.30 p.m.	11.50 p.m.	0.12	0.09	0.18	0.27	0.31	0.38	0.44	0.48	0.52	0.67	0.82	0.96	1.34	.....	.....
Bridgetown, Barbados	3	4.40 a.m.	10.15 p.m.	2.18	5.05 a.m.	5.45 a.m.	0.08	0.05	0.08	0.12	0.16	0.33	0.50	0.54	0.71	0.74	0.75	.....	.....	.....	.....
Havana Cuba	16	12.55 p.m.	3.30 p.m.	2.25	1.01 p.m.	2.06 p.m.	T.	0.12	0.27	0.34	0.38	0.44	0.65	0.94	1.24	1.45	1.73	2.08	2.19	.....	.....
Do	20	11.09 a.m.	2.00 p.m.	1.10	12.12 p.m.	12.47 p.m.	0.01	0.21	0.40	0.49	0.66	0.83	0.98	1.05	.....	.....	.....	.....	.....	.....	.....
Kingston, Jamaica	17-18	3.15 p.m.	8.00 a.m.	4.73	8.15 p.m.	9.05 p.m.	0.89	0.05	0.14	0.31	0.45	0.65	0.85	0.89	0.93	0.95	0.98	.....	.....	.....	.....
					9.05 p.m.	9.55 p.m.	.....	1.02	1.08	1.17	1.30	1.42	1.55	1.60	1.66	1.71	1.76	.....	.....	.....	.....
					9.55 p.m.	10.35 p.m.	.....	1.83	1.98	2.16	2.35	2.48	2.58	2.64	2.70	2.73	2.76	2.79	.....	.....	.....
Port of Spain, Trin.	21	11.09 a.m.	11.58 a.m.	0.75	11.10 a.m.	11.45 a.m.	T.	0.16	0.18	0.21	0.43	0.58	0.68	0.72	0.74	.....	.....	.....	.....	.....	.....
Do	29	9.33 a.m.	11.48 a.m.	0.91	9.33 a.m.	9.55 a.m.	0.00	0.35	0.51	0.61	0.71	0.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Puerto Principe, Cuba	14	4.26 p.m.	5.20 p.m.	0.73	4.30 p.m.	4.55 p.m.	0.01	0.31	0.52	0.61	0.64	0.68	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	8	2.00 p.m.	3.10 p.m.	0.81	2.05 p.m.	2.23 p.m.	T.	0.13	0.45	0.75	0.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	13	3.48 p.m.	9.30 p.m.	3.25	3.48 p.m.	5.05 p.m.	0.00	0.24	0.48	0.70	0.92	1.14	1.36	1.58	1.80	2.02	2.24	2.68	3.05	.....	.....
Do	17-18	6.17 p.m.	D. N.	1.56	6.20 p.m.	7.20 p.m.	0.01	0.07	0.15	0.23	0.37	0.53	0.62	0.73	0.78	0.83	0.88	0.98	1.08	.....	.....
Do	18	11.15 a.m.	7.20 p.m.	2.52	3.54 p.m.	4.34 p.m.	0.86	0.37	0.74	0.79	0.82	0.88	1.12	1.26	1.35	.....	.....	.....	.....	.....	.....
Roseau, Dominica	21-22	.....	.....	1.99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.61	.....	.....	.....
San Juan, Porto Rico	15	6.59 p.m.	8.20 p.m.	0.55	7.33 p.m.	7.45 p.m.	0.04	0.34	0.44	0.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Santiago de Cuba	9	D. N.	8.11 a.m.	0.80	6.06 a.m.	6.35 a.m.	0.01	0.17	0.40	0.48	0.54	0.64	0.69	0.72	0.75	.....	.....	.....	.....	.....	.....
Do	17	D. N.	D. N.	1.88	3.23 a.m.	3.55 a.m.	0.45	0.21	0.43	0.70	0.98	1.25	1.32	1.36	.....	.....	.....	.....	.....	.....	.....
Willemstad, Curaçao	15	.....	.....	0.06	.....	.....	.....	.....	.....	.....	0.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Self register not working. †Estimated. ‡6:10 p. m. to 7:30 p. m., 11th. §12:01 a. m. to 1:00 a. m., 12th. ‖12:30 p. m. to 2:00 p.m., 12th.

TABLE VI.—*Data furnished by the Canadian Meteorological Service, June, 1901.*

Stations.	Pressure. Mean not reduced.	Pressure. Mean reduced.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F.	29.74	29.89	—.06	49.8	— 1.8	58.0	41.6	3.26	—0.32	
Sydney, C. B. I.	29.92	29.96	+.08	56.8	+ 1.4	66.6	46.9	1.67	—2.02	
Halifax, N. S.	29.86	29.97	+.03	59.8	+ 2.1	69.3	50.3	6.97	+3.07	
Grand Manan, N. B.	29.89	29.94	—.01	58.0	+ 1.8	66.5	49.5	5.03	+2.73	
Yarmouth, N. S.	29.90	29.96	+.04	56.9	+ 1.9	64.7	49.0	2.36	+0.42	
Charlottet'n, P. E. I.	29.88	29.92	—.02	61.2	+ 3.8	70.7	51.6	1.29	—1.46	
Chatham, N. B.	29.89	29.91	.00	62.9	+ 2.9	74.4	51.4	1.30	—2.99	
Father Point, Que.	29.85	29.88	+.01	53.8	+ 0.8	62.8	44.9	3.37	+0.68	
Quebec, Que.	29.57	29.89	.00	64.2	+ 3.0	75.0	53.3	9.23	+5.96	
Montreal, Que.	29.70	29.90	.00	67.4	+ 2.5	76.1	58.8	1.97	—1.22	
Bissett, Ont.	29.33	29.93	+.03	63.7	+ 2.1	78.6	48.8	2.00	—0.75	
Ottawa, Ont	29.69	30.00	+.10	67.5	+ 2.2	78.4	56.6	3.76	+0.92	
Kingston, Ont	29.62	29.93	—.01	63.1	— 0.3	71.1	55.1	4.14	+1.74	
Toronto, Ont	29.58	29.95	—.01	66.0	+ 2.6	77.1	55.0	2.07	—0.65	
White River, Ont.	28.61	29.93	—.06	60.0	+ 1.3	74.6	45.5	2.08	+0.11	
Port Stanley, Ont	29.34	29.97	+.03	64.8	+ 1.0	74.9	54.7	2.08	—0.94	
Saugeen, Ont.	29.24	29.94	.00	63.4	+ 3.0	73.1	53.7	2.90	+0.53	

Stations.	Pressure. Mean not reduced.	Pressure. Mean reduced.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
Parry Sound, Ont	29.26	29.94	+.01	64.1	+ 2.4	74.8	53.4	3.44	+1.23	
Port Arthur, Ont.	29.18	29.88	—.04	56.8	+ 0.4	67.1	46.4	3.76	+0.95	
Winnipeg, Man.	29.05	29.86	.00	60.2	— 2.0	71.7	48.7	10.07	+6.23	
Minnedosa, Man.	28.04	29.81	—.02	57.3	— 2.3	67.9	46.8	6.64	+2.85	2.4
Qu'Appelle, Assin.	27.59	29.81	—.02	55.8	— 4.1	66.9	44.6	4.83	+1.48	0.3
Medicine Hat, Assin.	27.59	29.85	+.05	55.0	— 7.0	65.6	44.5	4.01	+0.98	
Swift Current, Assin.	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Calgary, Alberta	26.33	29.83	—.03	50.4	— 5.6	61.3	39.4	7.00	+4.66	5.4
Banff, Alberta	25.30	29.91	+.03	47.1	— 4.4	58.1	36.1	4.00	+0.67	4.8
Edmonton, Alberta	27.57	29.83	—.03	53.1	— 3.8	63.7	42.5	3.00	+0.81	T.
Prince Albert, Sask.	28.27	29.79	—.03	54.8	— 2.9	64.9	44.6	3.72	+1.16	
Battleford, Sask.	28.12	29.83	+.01	55.6	— 3.9	64.8	46.5	4.45	+1.27	
Kamloops, B. C.	28.70	29.96	+.04	60.8	— 3.0	72.2	49.3	2.09	+0.60	
Victoria, B. C.	29.95	30.05	+.04	54.7	— 1.6	60.9	48.4	1.06	—0.09	
Barkerville, N. W. T.	25.62	29.88	.....	47.4	— 3.3	59.1	35.6	4.00	+0.93	2.0
Hamilton, Bermuda	29.96	30.12	+.03	77.0	+ 2.0	83.2	70.8	1.54	—4.42	

TABLE VII.—*Heights of rivers referred to zeros of gages, June, 1901.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn.	1,954	14	6.2	30	4.0	18, 19	4.8	2.2
Reeds Landing, Minn.	1,884	12	5.0	30	2.7	15	3.0	2.3
La Crosse, Wis.	1,819	12	5.5	30	4.1	15, 16	4.7	1.4
Prairie du Chien, Wis.	1,759	18	5.7	1	3.6	17	4.4	2.1
Dubuque, Iowa	1,699	15	5.6	1, 2	3.9	19	4.6	1.7
Leclaire, Iowa	1,609	10	3.7	1–3	2.3	19–21	2.9	1.4
Davenport, Iowa	1,593	15	4.4	2	3.1	20, 21	3.6	1.3
Muscatine, Iowa	1,562	16	5.5	1–6	4.1	20–22	4.7	1.4
Galland, Iowa	1,472	8	2.7	6	1.6	22	2.1	1.1
Keokuk, Iowa	1,463	15	4.6	6	2.6	21, 22	3.3	2.0
Hannibal, Mo	1,402	13	5.7	7	3.6	21, 22	4.3	2.1
Grafton, Ill	1,306	23	7.0	1, 10	5.3	21	6.2	1.7
St. Louis, Mo	1,264	30	15.3	28	9.5	2	13.1	5.8
Chester, Ill.	1,189	36	12.0	29	7.4	3	10.1	4.6
New Madrid, Mo	1,003	34	23.7	1	16.9	28	20.6	6.8
Memphis, Tenn	843	33	19.9	3, 4, 9, 10	12.9	25	17.0	7.0
Helena, Ark	767	42	28.0	10	19.8	26	24.5	8.2
Arkansas City, Ark.	635	42	29.3	12	20.6	27	25.9	8.7
Greenville, Miss	595	42	34.4	12	16.9	28	21.3	7.5
Vicksburg, Miss	474	45	27.8	13, 14	19.2	30	24.5	8.6
New Orleans, La	108	16	10.1	14, 15	7.0	29, 30	8.9	3.1
Missouri River.								
Bismarck, N. Dak.	1,309	14	10.2	5	6.5	23	8.0	3.7
Pierre, S. Dak.	1,114	14	9.8	18	7.6	26–28	8.7	2.2
Sioux City, Iowa	784	19	13.5	21	10.2	28	11.8	3.3
Omaha, Nebr.	669	18	13.8	23	11.3	6, 7	12.5	2.5
Plattsmouth, Nebr.	641	18	9.6	23	6.8	30	8.4	2.8
St. Joseph, Mo.	481	10	9.6	24	6.3	1	7.7	3.3
Kansas City, Mo.	388	21	19.4	24, 25	14.7	1	17.1	4.7
Boonville, Mo	199	20	15.8	26	9.6	1	13.5	6.2
Hermann, Mo.	103	24	14.4	27	7.5	1	12.0	6.9
Osage River.								
Bagnell, Mo.	70	28	1.2	1, 2	0.9	8–30	0.9	0.3
Des Moines River.								
Des Moines, Iowa	205	19	4.0	1, 10, 11	3.6	24–30	3.8	0.4
Illinois River.								
Peoria, Ill.	135	14	6.8	1, 2	6.4	26–30	6.6	0.4
Beardstown, Ill	70	12	7.8	1–4, 7–10	7.4	22, 26	7.6	0.4
Youghiogheny River.								
Confluence, Pa.	59	10	4.0	1	1.2	27, 28	1.9	2.8
West Newton, Pa.	15	23	4.8	1	1.0	22, 23	2.0	3.8
Allegheny River.								
Warren, Pa.	177	14	5.6	1	1.0	29, 30	2.6	4.6
Oil City, Pa	123	13	6.2	1	1.6	30	2.9	4.6
Parker, Pa	73	20	6.9	1	1.6	27, 28	3.1	5.3
Monongahela River.								
Weston, W. Va.	161	18	1.3	24	−0.2	21, 22	0.2	1.5
Fairmont, W. Va.	119	25	5.9	18	1.1	7	2.8	4.8
Greensboro, Pa.	81	18	10.2	9	7.9	7, 24	8.7	2.3
Lock No. 4, Pa.	40	28	12.0	1	7.1	25	8.8	4.9
Conemaugh River.								
Johnstown, Pa.	64	7	5.5	7	2.4	25, 28	3.0	3.1
Red Bank Creek.								
Brookville, Pa	35	8	2.0	1	0.2	13–23, 28–30	0.6	1.8
Beaver River.								
Ellwood Junction, Pa.	10	14	4.5	1, 23	3.0	13, 14, 17–20	3.8	1.5
Great Kanawha River.								
Charleston, W. Va.	58	30	30.9	24	5.5	14	10.3	25.4
Little Kanawha River.								
Glenville, W. Va.	103	20	3.5	23	0.0	16	1.7	3.5
New River.								
Hinton, W. Va.	95	14	10.0	24	3.0	14	5.0	7.0
Cheat River.								
Rowlesburg, W. Va.	36	14	4.8	8	1.9	6	3.1	2.9
Ohio River.								
Pittsburg, Pa	966	22	12.4	1	3.9	14	5.7	8.5
Davis Island Dam, Pa.	960	25	12.7	1	6.0	13–15, 29	7.4	6.7
Wheeling, W. Va.	875	36	20.5	1	7.3	14, 15, 17, 20	9.8	13.2
Parkersburg, W. Va.	785	35	22.8	1	8.3	29	11.9	14.5
Point Pleasant, W. Va.	708	39	32.2	24, 25	10.6	16	18.7	21.6
Huntington, W. Va.	660	50	38.1	25	14.7	14	23.6	23.4
Catlettsburg, Ky	651	50	39.1	25	14.7	16	24.1	24.4
Portsmouth, Ohio	612	50	39.3	1	15.7	16	25.3	23.6
Cincinnati, Ohio	499	50	40.0	1, 2	17.7	17	28.1	22.3
Madison, Ind.	413	46	32.7	2	15.9	18	23.9	16.8
Louisville, Ky.	367	28	18.3	3	8.1	18	10.3	5.2
Evansville, Ind	184	35	28.6	5	14.0	20	21.2	14.6
Paducah, Ky.	47	40	24.9	1	12.6	22, 23	18.4	12.3
Cairo, Ill	1,073	45	29.5	1	20.5	22, 23	26.0	9.0
Muskingum River.								
Zanesville, Ohio.	70	20	11.9	26	7.7	11, 12	9.2	4.2
Scioto River.								
Columbus, Ohio.	110	17	7.5	26	2.2	14, 15	3.5	5.3
Miami River.								
Dayton, Ohio.	77	18	2.9	23, 24	1.2	11, 12, 19, 20	1.7	1.7
Wabash River.								
Mount Carmel, Ill.	50	15	9.4	29	3.0	1, 15, 19, 20	4.7	6.4
Licking River.								
Falmouth, Ky.	30	25	5.0	6, 7, 28	2.6	2–5, 13	3.4	2.4
Kentucky River.								
Frankfort, Ky.	65	31	8.0	20–22	6.0	6–8	7.1	2.0
Clinch River.								
Speers Ferry, Va	156	20	14.6	23	1.0	15	2.4	13.6
Clinton, Tenn.	52	25	15.0	25	5.4	8	8.0	9.6
Tennessee River.								
Knoxville, Tenn.	635	29	8.1	24, 25	3.3	14	5.4	4.8
Kingston, Tenn.	556	25	8.1	22	3.4	14	5.3	4.7
Chattanooga, Tenn.	452	33	12.0	1	6.1	14	8.2	5.9
Bridgeport, Ala.	402	24	10.0	1	4.4	15	6.4	5.6

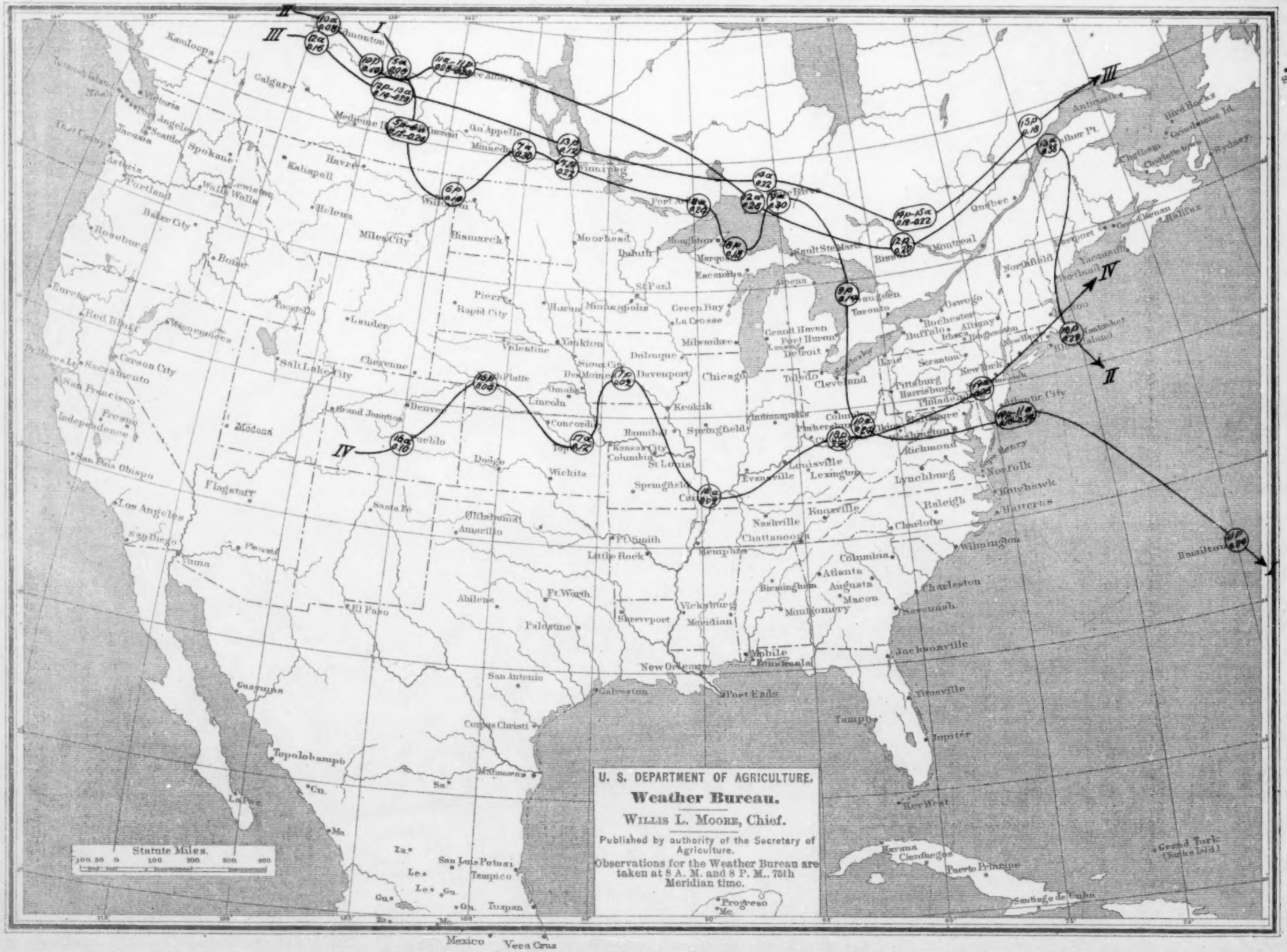
Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Tennessee River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Florence, Ala.	255	16	10.2	1	4.2	17	6.0	6.0
Riverton, Ala.	225	25	17.0	1	5.0	17	7.9	12.0
Johnsonville, Tenn.	95	24	22.1	1	6.1	19	9.5	16.0
Cumberland River.								
Burnside, Ky.	516	50	24.5	22	2.6	30	5.7	21.9
Carthage, Tenn.	305	40	14.9	25	2.9	18	5.3	12.0
Nashville, Tenn	189	40	17.2	26	4.8	19	7.8	12.9
Clarksville, Tenn.	126	42	18.1	27	5.6	30	9.5	12.5
Arkansas River.								
Wichita, Kans.	832	10	4.3	9	1.4	7	2.7	2.9
Webbers Falls, Ind. T.	465	23	4.7	13	1.9	30	2.6	2.8
Fort Smith, Ark.	403	22	7.1	2	1.9	29, 30	4.1	5.2
Dardanelle, Ark.	256	21	6.0	4	1.9	30	3.7	4.1
Little Rock, Ark.	176	23	7.0	5	3.5	30	5.1	3.5
White River.								
Newport, Ark.	150	26	2.4	1	1.0	26–30	1.5	1.4
Yazoo River.								
Yazoo City, Miss.	80	25	9.0	1	0.1	30	4.5	8.9
Red River.								
Arthur City, Tex.	638	27	19.4	3	5.7	30	10.0	13.7
Fulton, Ark.	515	28	22.6	5	7.0	30	13.6	15.6
Shreveport, La	337	29	16.4	7	6.6	30	12.6	9.8
Alexandria, La	118	33	14.5	11	5.5	30	11.3	9.0
Ouachita River.								
Camden, Ark	304	30	8.7	11	3.3	30	5.3	5.4
Monroe, La	122	40	11.1	1	1.6	30	5.7	9.5
Atchafalaya River.								
Melville, La.	100	31	26.2	11–16	20.2	30	24.5	6.0
Susquehanna River.								
Wilkesbarre, Pa.	183	14	12.2	1	−0.6	20	3.8	12.8
Harrisburg, Pa.	69	17	12.6	1	3.1	21	5.1	9.5
W. Br. of Susquehanna.								
Williamsport, Pa.	30	20	9.8	1	2.6	20	4.5	7.2
Juniata River.								
Huntingdon, Pa.	90	24	5.3	1, 2	3.8	18–20	4.2	1.5
Potomac River.								
Harpers Ferry, W. Va.	172	16	9.0	1	0.0	12–15, 27–30	2.7	9.0
James River.								
Lynchburg, Va	260	18	11.5	16	1.7	13–14	3.3	9.8
Richmond, Va.	111	12	11.3	18	−1.0	30	1.6	12.3
Roanoke River.								
Weldon, N. C.	129	40	15.8	19	8.9	14, 15	11.0	6.9
Cape Fear River.								
Fayetteville, N. C.	112	38	23.0	19	4.4	13	9.9	18.6
Edisto River.								
Edisto, S. C.	75	6	5.7	1	4.0	29, 30	4.9	1.7
Pedee River.								
Cheraw, S. C.	149	27	32.5	18	3.8	13	12.6	28.7
Black River.								
Kingstree, S. C	60	12	12.0	1	8.0	12, 13	10.1	4.0
Lynch Creek.								
Effingham, S. C.	35	12	17.2	22	6.0	11	10.7	11.2
Santee River.								
St. Stephens, S. C.	50	12	15.8	1	8.2	19, 20	10.1	7.6
Congaree River.								
Columbia, S. C.	37	15	14.8	17	1.7	6	4.2	13.1
Wateree River.								
Camden, S. C.	45	24	27.4	18	9.1	12	16.0	18.3
Waccamaw River.								
Conway, S. C.	40	7	6.8	5	5.0	13, 14	5.8	1.8
Savannah River.								
Calhoun Falls, S. C.	347	.....	13.0	16	3.4	12	4.7	9.6
Augusta, Ga.	268	32	27.0	16	8.8	12	13.4	18.2
Broad River.								
Carlton, Ga.	30	.....	11.2	16	2.7	10, 11	4.0	8.5
Flint River.								
Albany, Ga	80	20	11.2	6	2.1	29	8.2	9.1
Chattahoochee River.								
Westpoint, Ga.	239	20	7.9	16	3.7	25, 26	5.1	4.2
Ocmulgee River.								
Macon, Ga.	125	20	9.9	1	3.3	12	5.8	6.6
Oconee River.								
Dublin, Ga.	79	30	11.4	18	3.7	25	7.2	7.7
Coosa River.								
Rome, Ga	271	30	10.6	1	2.7	25, 26	4.8	7.9
Gadsden, Ala	144	18	11.5	3	2.6	28, 29	5.1	8.9
Alabama River.								
Montgomery, Ala.	265	35	15.0	4	3.7	29	7.7	11.3
Selma, Ala.	212	35	19.8	6	1.2	29, 30	9.1	18.6
Tombigbee River.								
Columbus, Miss.	303	33	3.9	4	−2.7	29	−0.8	6.6
Demopolis, Ala.	155	35	18.0	8	0.1	29	7.2	17.9
Black Warrior River.								
Tuscaloosa, Ala	129	43	16.6	3	1.6	29, 30	6.1	15.0
Brazos River.								
Kopperl, Tex.	369	21	6.5	3	0.5	10–30	1.1	6.0
Waco, Tex	301	22	10.2	3	1.8	22–30	3.5	8.4
Booth, Tex.	76	39	12.8	7	0.3	30	4.8	12.5
Columbia River.								
Umatilla, Oreg	270	25	22.0	1	15.5	30	18.3	6.5
The Dalles, Oreg	166	40	37.5	1	25.1	30	30.6	12.4
Willamette River.								
Albany, Oreg	119	20	4.0	1	1.9	30	2.8	2.1
Portland, Oreg	12	15	20.8	3	13.4	30	17.2	7.4
Sacramento River.								
Red Bluff, Cal.	265	23	2.0	1, 2	0.6	29, 30	1.2	1.4
Sacramento, Cal.	64	29	20.2	1	12.4	30	15.9	7.8

XXIX—64.

Bakersville

Chart I. Tracks of Centers of High Areas. June, 1901.

Chart I. Tracks of Centers of High Areas. June, 1901.



• Baskerville

Chart II. Tracks of Centers of Low Areas. June, 1901.

• Baskerville

Chart III. Total Precipitation. June, 1901.

Chart III. Total Precipitation. June, 1901.

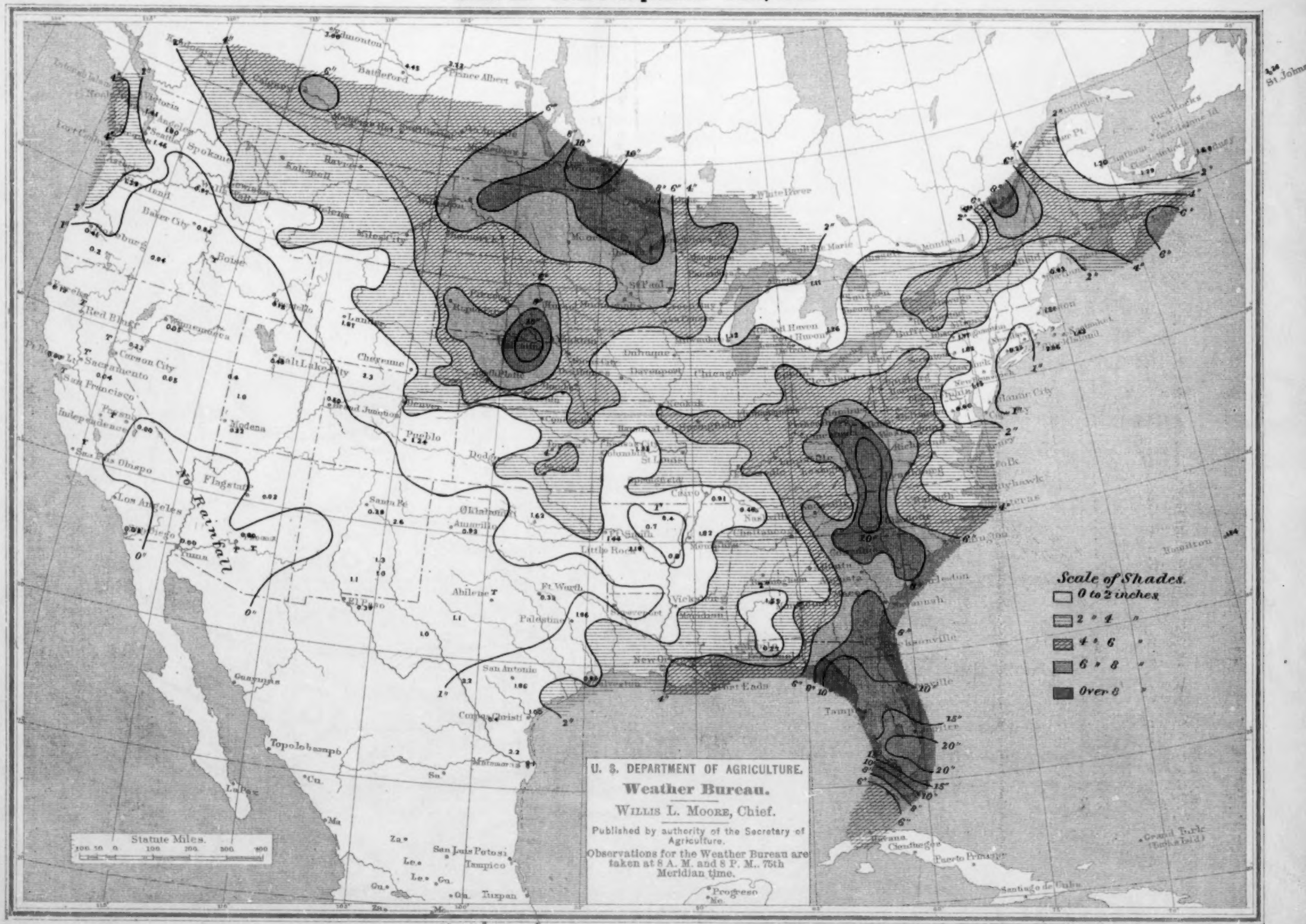

Rainfall
Scale of Shades.
0 to 2 inches
2 " 4 "
4 " 6 "
6 " 8 "
Over 8 "
Statute Miles.
100 50 0 100 200 300 400
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
Willis L. Moore, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Mexico
Vera Cruz

Chart IV. Sea-Level Pressure and Temperature; Resultant Surface Winds. June, 1901.

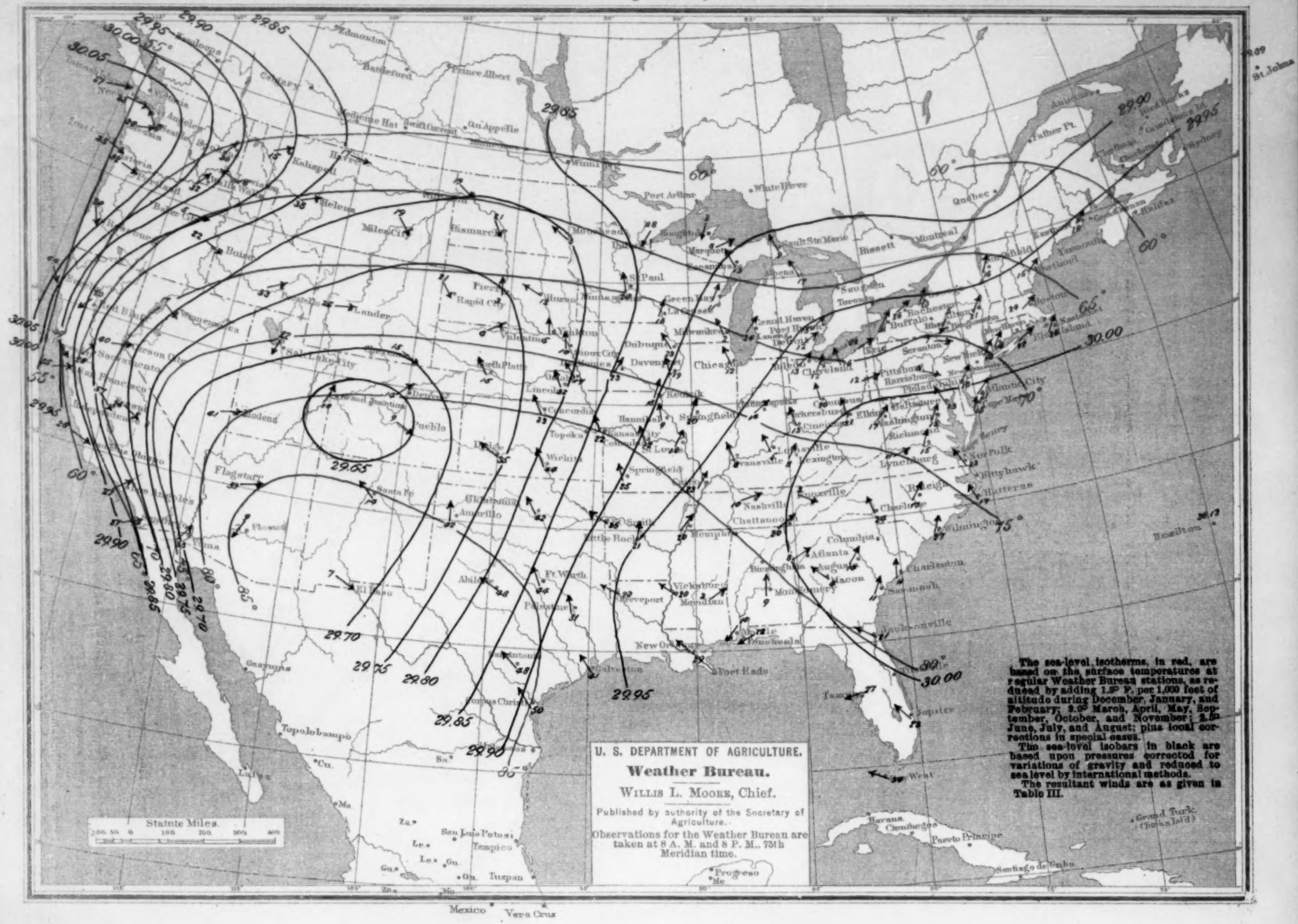

Statute Miles.
200 50 0 100 200 300 400
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
The sea-level isotherms, in red, are based on the surface temperatures at regular Weather Bureau stations, as reduced by adding 1.5° F. per 1,000 feet of altitude during December, January, and February; 2.0° March, April, May, September, October, and November; 2.5° June, July, and August; plus local corrections in special cases.
The sea-level isobars in black are based upon pressures corrected for variations of gravity and reduced to sea level by international methods.
The resultant winds are as given in Table III.
Mexico
Vera Cruz

Chart V. Hydrographs for Seven Principal Rivers of the United States. June, 1901.

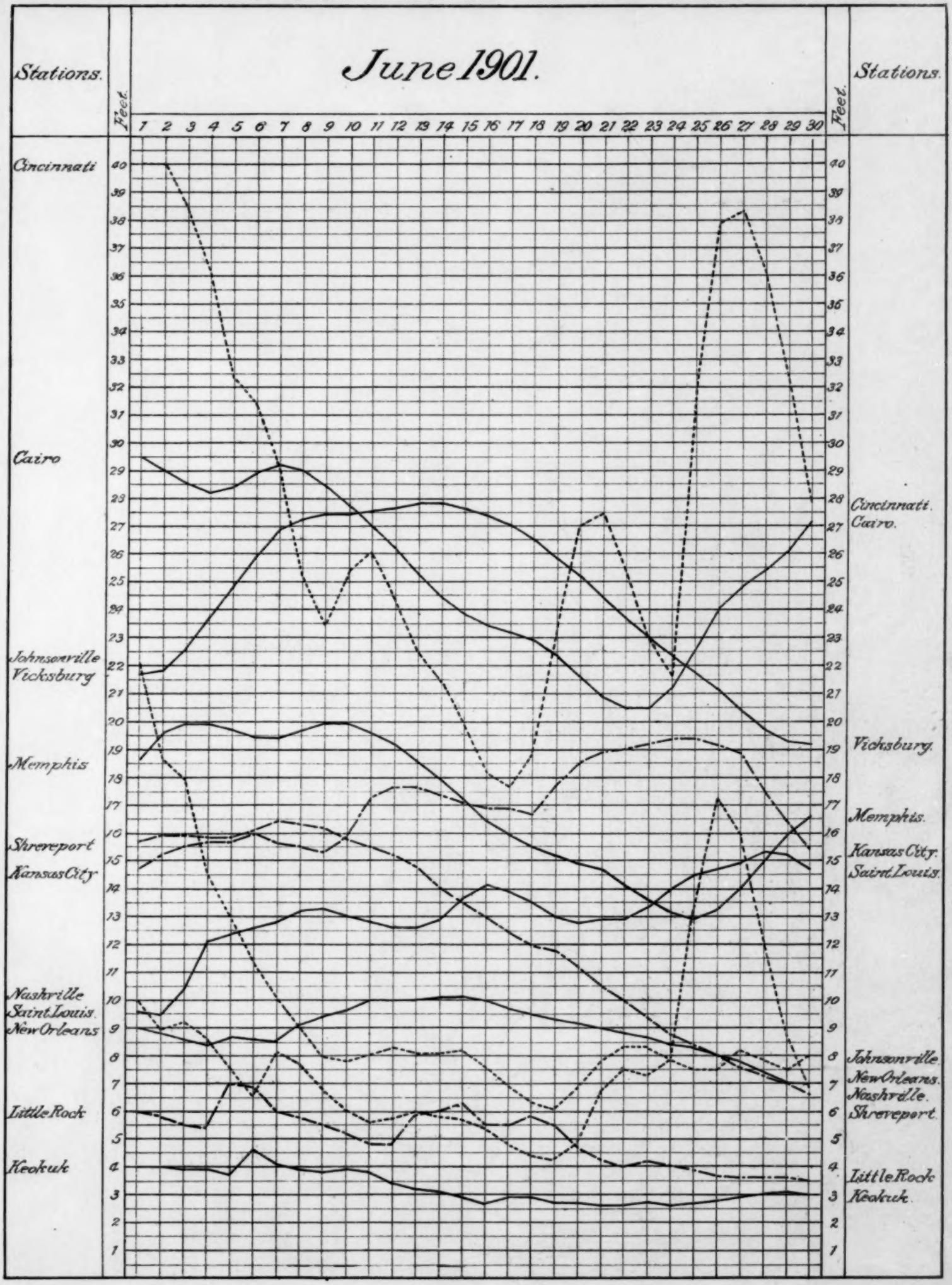


Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. June, 1901.

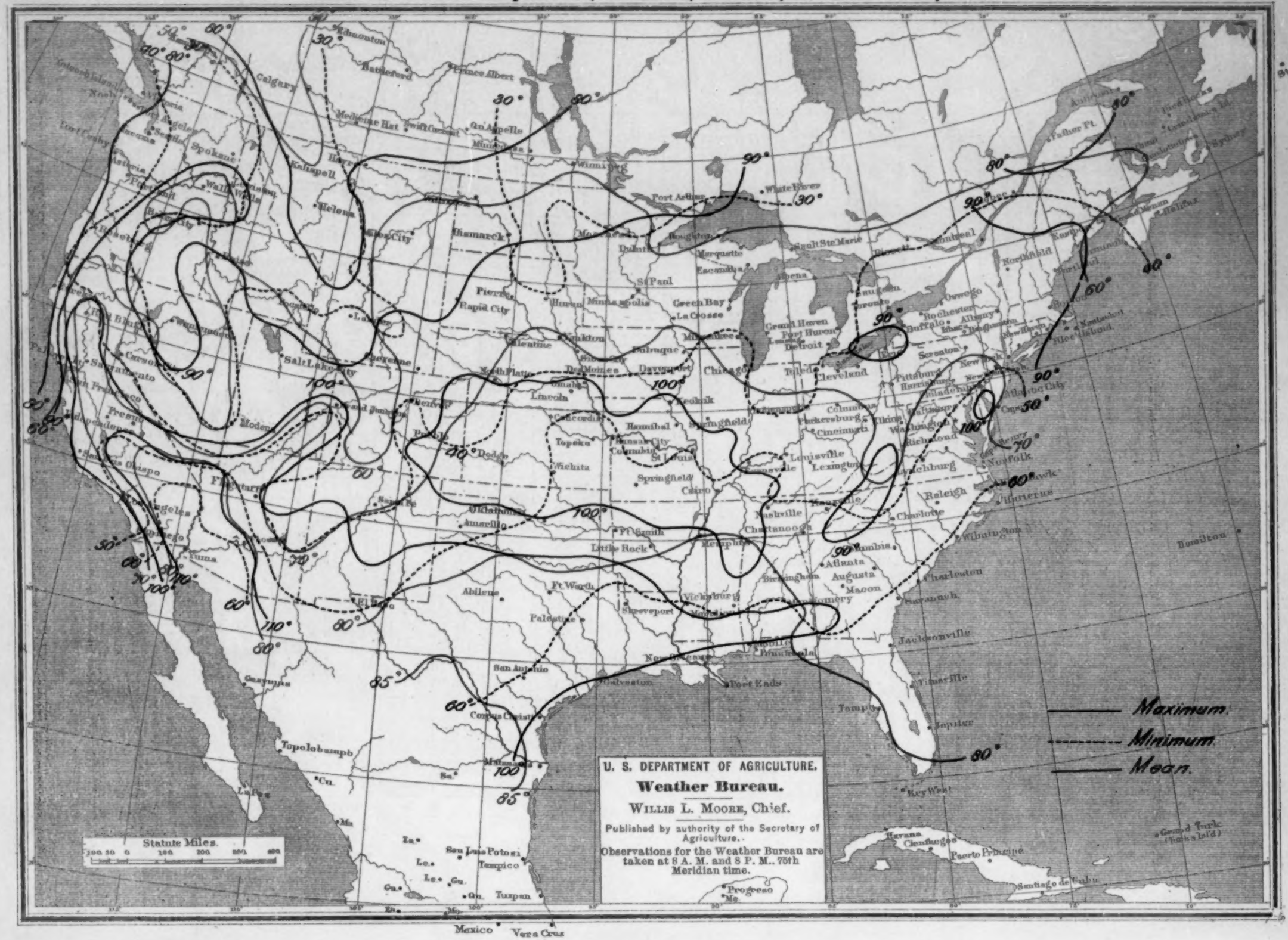


Chart VII. Percentage of Sunshine. June, 1901.

Chart VII. Percentage of Sunshine. June, 1901.

Scale of Shades.

Over 70 per cent.

60 to 70

50 . 60

40 . 50

Under 40

Statute Miles.

100 50 0 100 200 300 400

U. S. DEPARTMENT OF AGRICULTURE.

Weather Bureau.

WILLIS L. MOORE, Chief.

Published by authority of the Secretary of Agriculture.

Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart VIII. West Indian Monthly Isobars, Isotherms, and Resultant Winds. June, 1901.

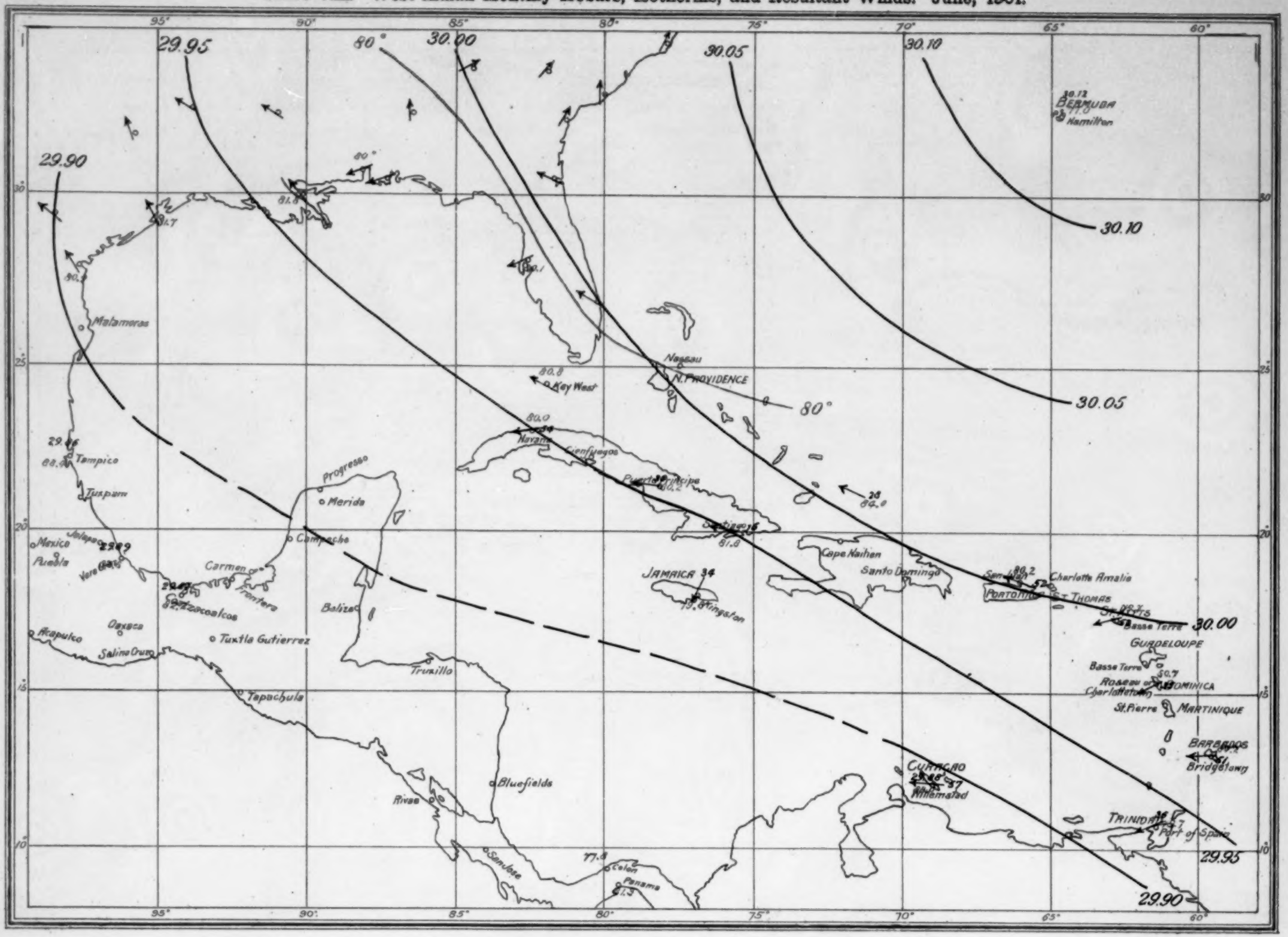
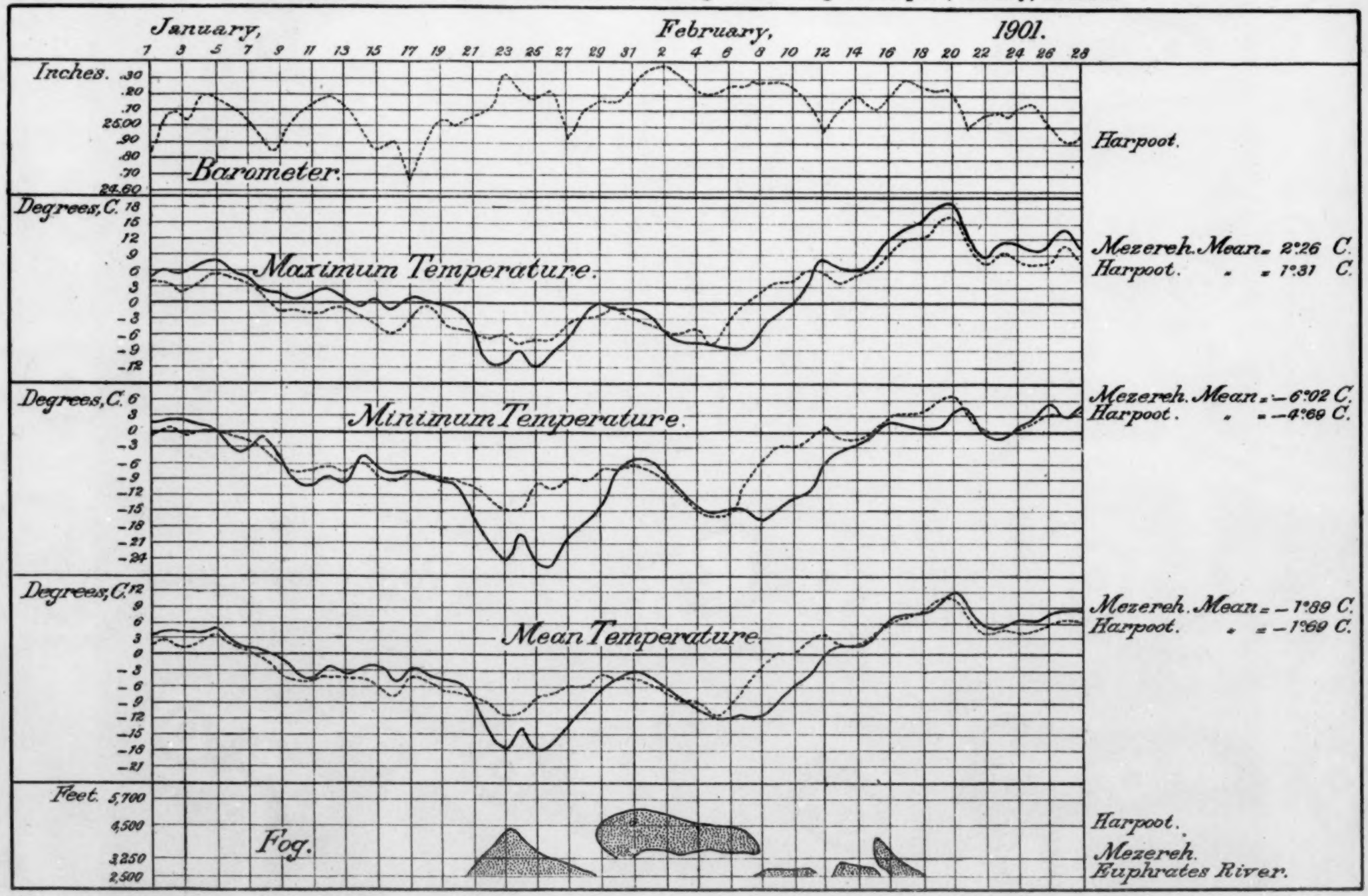
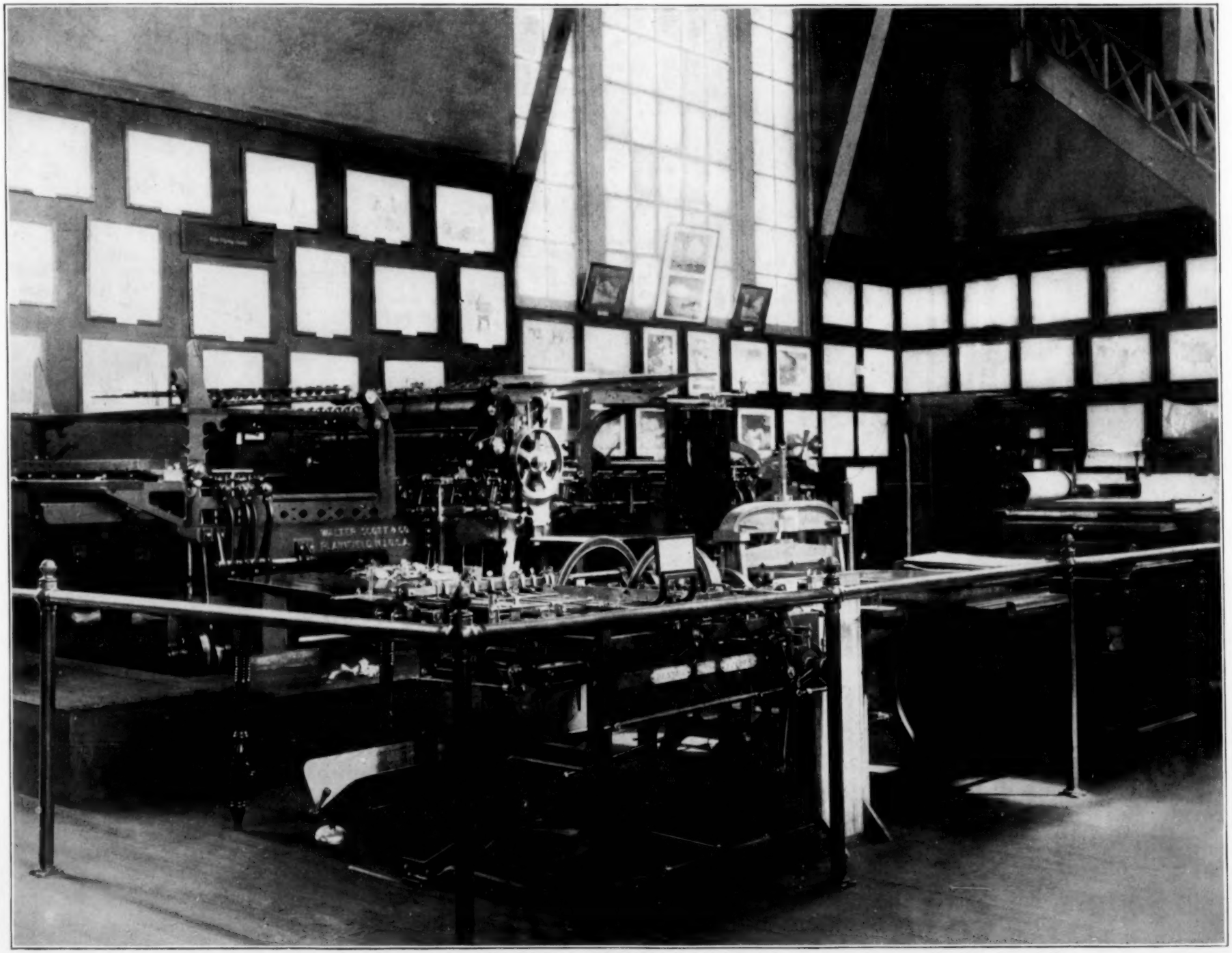


Chart IX. Meteorological Conditions Attending Winter Fog at Harpoot, Turkey, in Asia.


January,
February,
1901.
7 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28
Inches. 30 20 10 25.00 90 80 70 24.60
Barometer.
Harpoot.
Degrees, C. 18 15 12 9 6 3 0 -3 -6 -9 -12
Maximum Temperature.
Mezereh. Mean = 2°.26 C.
Harpoot. " = 1°.31 C.
Degrees, C. 6 3 0 -3 -6 -9 -12 -15 -18 -21 -24
Minimum Temperature.
Mezereh. Mean = -6°.02 C.
Harpoot. " = -4°.69 C.
Degrees, C. 12 9 6 3 0 -3 -6 -9 -12 -15 -18 -21
Mean Temperature.
Mezereh. Mean = -1°.89 C.
Harpoot. " = -1°.69 C.
Feet. 5,700 4,500 3,250 2,500
Fog.
Harpoot.
Mezereh.
Euphrates River.

Meteorological instruments and apparatus.



Weather forecast and map-printing section.

Roof of North Pavilion, Government Building; wind instruments on 40-foot steel tower.

North Pavilion, Government Building, containing exhibits of the United States Department of Agriculture.